FIELD MONITORING OF THE DEVELOPMENT, STABILITY AND DESTRUCTION OF BLACK SAND BEACHES OFF ACTIVE LAVA FLOWS DURING THE CURRENT ERUPTION OF KILAUEA VOLCANO, ALONG THE SOUTHEASTERN COAST OH HAWAI'I, PUNA DISTRICT.

Lawrence "Mark" Thomas
University of Hawaii
Windward Community College

Advisor: Dr. Floyd W. McCoy
WCC-MOP Coordinator

On January 3, 1983, the longest volcanic eruption in recorded history had commenced within Hawaii Volcanoes National Park on the island of Hawaii; producing on the average of 500,000 cubic meters of lava per day as either surface flows or through tube systems and draining into the ocean near the Lae 'Apuki ahupua'a (land division) at the time of the research from July to October of 1995. As the lava enters the ocean, pyroclastic explosions occur and the wave activity helps to produce black sand particles. Such is precariously sloped against steep sea cliffs and thousands of feet of water, dramatically altered by the erosional effects of tidal/current changes, weather patterns, earthquakes, bench collapses, volcanic activity/inactivity, etc. Five site locations were choosen to document such complex changes by observations and photography (three times weekly) and the resulting time-lapse process will give account of the dynamics associated with volcanoes, its associated geology and oceanography.

MARINE OPTION PROGRAM
Windward Community College
MOP Skill Project Proposal

Title: FIELD MONITORING OF THE DEVELOPMENT, STABILITY AND DESTRUCTION OF BLACK SAND BEACHES OFF ACTIVE LAVA FLOWS DURING THE CURRENT ERUPTION OF KĪLAUEA VOLCANO, ALONG THE SOUTHEASTERN COAST OF HAWAI'I, PUNA DISTRICT.

Mop/Faculty Advisor: University of Hawaii, Windward Community College, 45-720 Keaahala Road, Kaneohe, HI 96744. Dr. Floyd W. McCoy (235-7316).

Field Work Location: Hawai'i Volcanoes National Park.

Duration Of Field Work/Study: Three months field work and one month to prepare the final report, photographs and video.

Proposal Date: Summer/Fall 1995.

Date Of Completion: May 1996 (MOP Student Symposium).

Student: Lawrence "Mark" Thomas, 45-906 B.#1. Anoi Road, Kaneohe, HI 96744 (235-0702, unlisted).

Student Experience: Park Ranger (National and City & County of Honolulu), Law Enforcement Officer (State of Hawaii), U.S. Merchant Marine Officer (Boat Captain-Master), Trek Coordinator-Leader, Wilderness Guide, Hawaii Bound (Outward Bound) Instructor, Environmental Educator, Tour Guide, Scientific Illustrator.

Introduction

As a seasonal ranger for the Hawai'i Volcanoes National Park (HVNP), my primary duties commencing July through September of 1995, will be to monitor on a daily basis the volcanic activity along the southeastern coast of Hawai'i, Puna District. The primary duties are to provide visitor interpretation and safe access (if possible) into active coastal eruption sites and to inform scientist with the U.S. Geological Society (USGS) at the Hawai'i Volcanoes Observatory (HVO) of any relevant information. Occasionally, such geologist/volcanologist perform field work in the area and assists eruption duty staff in assessing any potential hazards (lava flows, methane explosions, tube systems, skylights, toxic gases, etc.). The combined data of observations are documented during weekly meetings and reported to respective parties through unpublished notes (to be included in my final report as bibliography).

In the spring of 1995, Dr. McCoy who has been studying the coastal dynamics of this current eruption for several years, thought that my position with (HVNP) would be a prime opportunity to document on a period basis (never before assembled) such changes and encouraged me to submit this proposal for MOP and independent study credit. In April of 1995, we spent one

day at the flows planning the field work.

The proposed project is designed to monitor/photograph complex changes in volcanic activity (lava flow volume), earthquakes, bench collapses, tidal changes, moon phases and other pertinent observations associated with the development, stability and destruction of black sand beaches freshly produced and precariously sloped against steep sea cliffs and thousands of feet of water. This combined with surface lava flows is the equivalent of the laying of cement without rebar reinforcement and it could collapse at any given moment without warning as the result of wave/current under cutting and gravitational forces. Such catastrophic events has claimed human life and serious injury in the last two years and could have been prevented had the individuals had abided regulations closing off access into such dangerous areas. Daily assessment of such coastal changes by (HVNP) and (HVO) staff is required to hopefully prevent such tragedy, help protect against liability claims and provide a better understanding of the natural processes involved in shield development and the associated erosional forces at work.

Description Of The Proposed Research

As previously mentioned, preliminary field work established three coastal bench marks to utilize as photographic stations in which to monitor changes along the Lae 'Apuki ahupua'a (land division), just past the mile twenty marker of (HVNP) Chain of Craters Road and closed for the next nine miles by lava flows since 1986. It is highly possible that given the volume of lava (500,000 cubic meters per day) coming from the Pu'u 'O'O vent, almost seven miles mauka, it could very well advance southwest ward and consume the photographic stations and new locations must be found.

Three times weekly and from the exact location of each bench mark, a still photograph will be taken to document any alterations of the geological and erosional effects upon the coastline. The camera to be used is a Vivitar 300Z, Series 1. Auto Focus Zoom Lens (35mm) and upon completion of the project the individual assemblage of photos shall be re-shot on video in an attempt to illustrate time lapse photography in a matter of minutes. The original photos shall be incorporated into final report text which will include daily documentation of site(s) data (time of photo taken, film roll/photo number), tidal calculations (time/wave heights), moon phases, wind conditions, current patterns, pertinent observations (earthquakes, tidal waves, storms, lava flows, pause in activity, bench collapses,etc.) and (HVO) meeting notes.

It would be highly desirable to take each photograph during periods of low tide (day light hours), but having been previously employed as a eruption duty ranger, I forsee this to be impossible due to schedule changes, duty assignments, emergency operations (evacuation, first aid, search/rescue, law enforcement/fire/helicopter missions), meetings, sickness/injury and hopefully not death. Further, the eruption could stop and my service no longer require. Total operational cost is $75.00 for film purchase and development.

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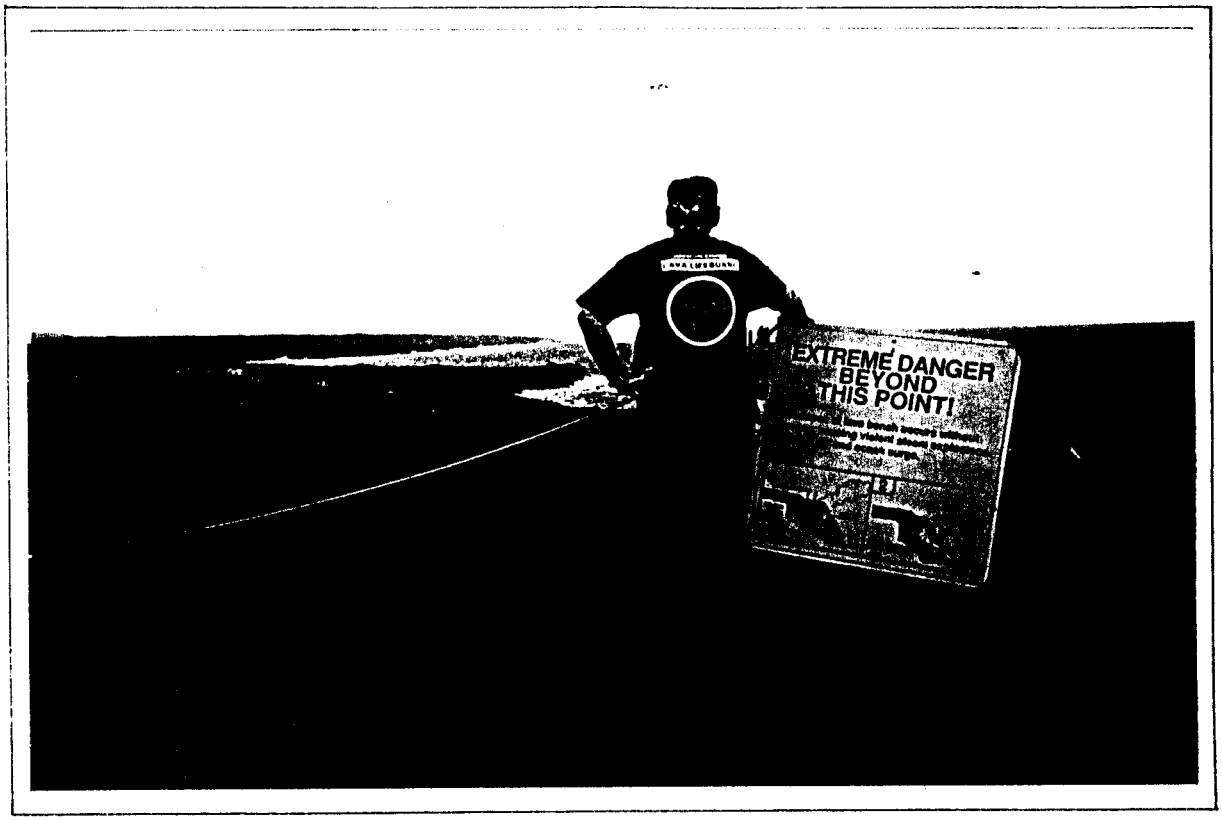


Prepared for

OCEANOGRAPHY 199 - OCEANOGRAPHY,

GEOLOGY 199 - GEOLOGY

and the

UNIVERSITY of HAWAI'I,

WINDWARD COMMUNITY COLLEGE,

MARINE OPTION PROGRAM (MOP)

by L. Mark Thomas

February 1996

ACKNOWLEDGEMENTS

This project would not have been a reality if it had not been for Ranger Joel Ellis and Ranger Gail Minami, whom had given me the opportunity to work for the Protection Division of Hawai'i Volcanoes National Park since 1994. The cooperative efforts and dissemination of information from the Interpretation staff, the Fire Crew, HVO and USGS personnel, visiting Geologist and on occasion tour helicopter pilots; they all added to the better understanding of our natural environment and ever changing landscape. Of course, one must also give credit to Dr. Floyd McCoy to whom inspired this project as a continuation of his own research on the formations of black sand beaches. I must also thank the staff of Hoomaluhia Botanical Garden for allowing me to take leave from work to full fill my dream of becoming a National Park Ranger at HVNP. Lastly, to my family whom have supported me in such endeavors and to the man up stairs whom got me through it all safely and more enriched. Mahalo nui loa to all.

INTRODUCTION

The following data was collected while being employed as a Park Ranger (second season) for the Hawai'i Vocanoes National Park from July 9 to October 28, 1995. Such duties involved monitoring active volcanic eruptions and providing visitor safety and interpretation of such events. It also enabled me the opportunity to create an independent study project through the University of Hawai'i, Windward Community College. The course objective being to document the natural processes involved in the development, stability and destruction of black sand beaches off of active lava flows associated with the current volcanic activity of Kilauea, southeastern coast of Hawai'i. Such data of weather patterns, tidal conditions, moon phases, lava flows, coastal changes in bench collapses and other pertinent observations has never been recorded on such a periodic basis.

In April of 1995, Dr. Floyd McCoy and myself had established three coastal bench marks to use as photographic stations to monitor the changes along the Lae 'Apuki ahupua'a (land division) of the Puna district. At the time of such initial field work, active lava flows were burning through vegetation and creating methane explosions all about. The pahoehoe lava had just begun to cascade over the original sea cliffs braced by a newly formed lava bench and eventually made its way to the waters edge and producing hydrocloric acid steam plumes.

Such activity continued on into early May (7th) and claiming an additional quarter of a mile of the Chain of Craters Road (over eight miles are now covered). It also added over twenty visible acres of new land on top of freshly produced black sand precariously sloped against the sea cliffs and thousands of feet of ocean water. Such is equivalent to the laying of cement without rebar and could collapse without warning at any given moment; thus it could be catastrophic if people are on top such when it finally gives away to wave under cutting and gravitational forces. It happened a couple of years prior when half an acre fell off and claiming one life and seriously injuring fourteen others.

As a result of the surface flows, my photo stations were consumed and I was required to relocate further westward down the coast (refer to the maps).

The primary documentation of the erosional effects of the area was centralized around sites one and two located .02 - .03/10th of a mile west of the Lae 'Apuki/Panau Nui ahupua'a boundary (sign and stone marker system inland). Site one faces the eastern side (Kalapana direction) and site two faces the western side (South Point direction).

Sites three also faces the east and site four facing the west; both are located almost directly makai (ocean side) of the said boundary marker and off of the temporary "Makai Trail" created to provide visitor viewing of the eruption site towards the east.

Site five (sink hole) came later in the project and was 25-30 yards east of sites three and four photo station.

Detailed analysis of the individual site(s) location photographs have been excluded from the project data in an attempt to draw the viewers attention to the respected plate(s) for a better reference of the natural occurrences in progress at the time of filming. As some people might say, "a picture is worth a thousand words".

Due to unforeseen circumstances of my duties for HVNP, I was unable to establish a set time period in order to take such photographs and as a result the lighting may be off. The camera utilized was a Vivitar 300Z Series 1. Auto Focus Zoom Lens (35mm).

The individual assemblage of the photographs taken will be re-shot on video in an attempt to illustrate time lapse photography and shall be presented at a MOP symposium on 04/20/96.

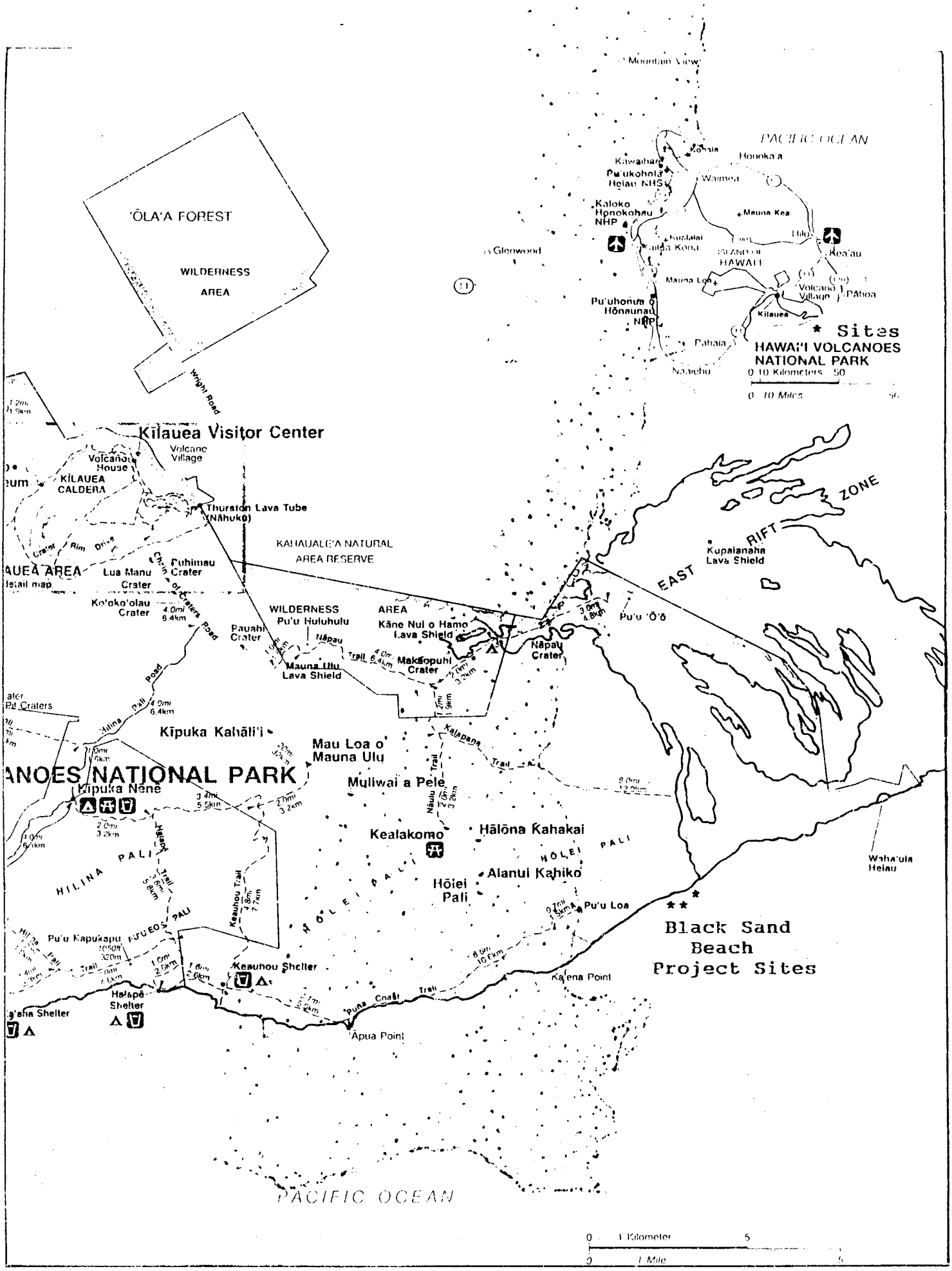
The tidal calculations were derived from the State of Hawai'i, Division of Aquatic Resources, Education Program, 1995 Tide Calendar and is based upon the medium measurements of between Honuapu and Hilo stations after subtracting the tidal differences of Honolulu Harbor. The example being that Honuapu is -0.28 minutes (high or h tide) and Hilo is -1.01 (one hour, one minute h tide). The general geographic location of the eruption site is right in between both stations and therefore is approximately -0.45 minutes (h).

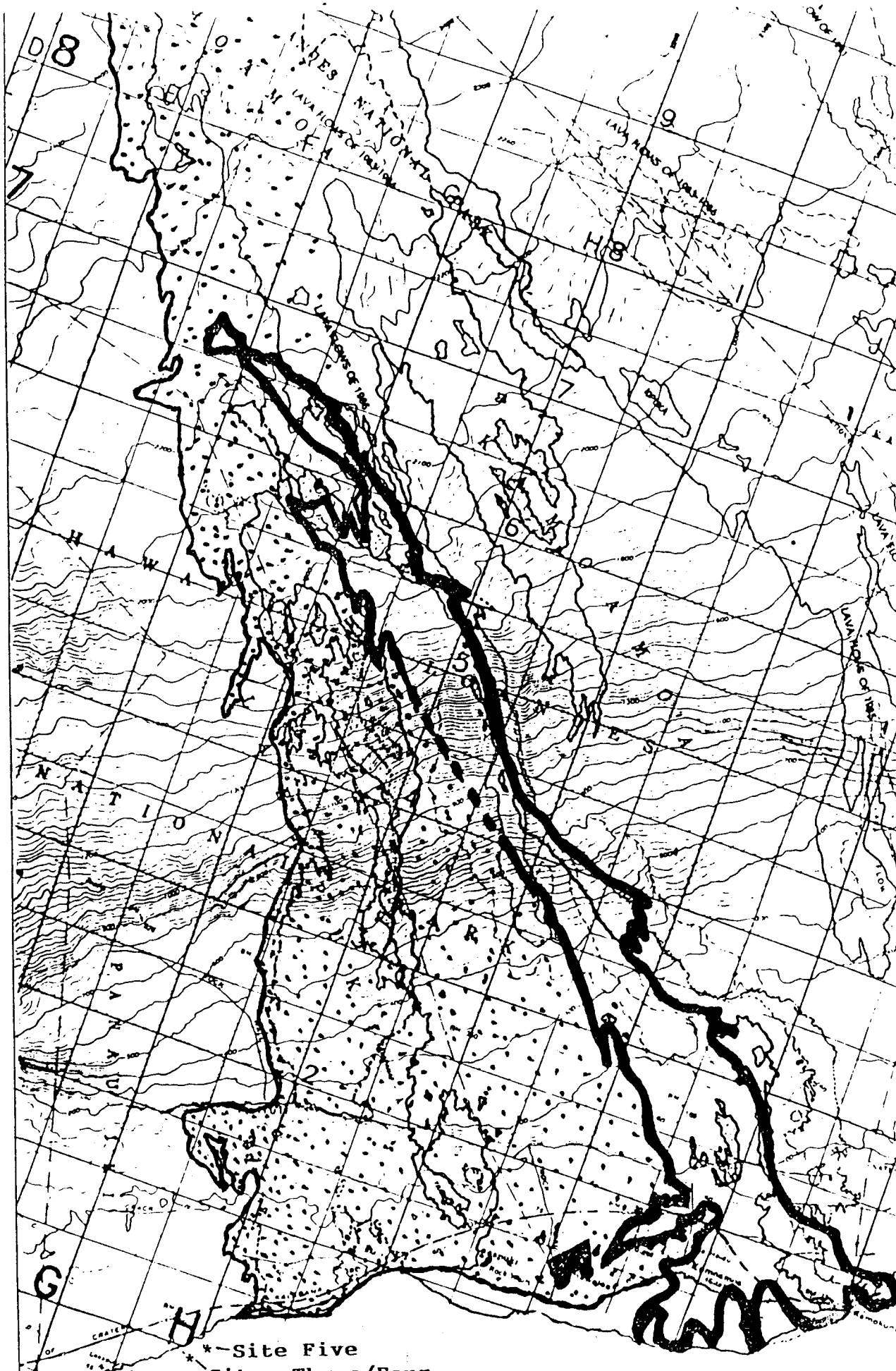
The tidal scale shown in the project data reflects the adjusted time (i.e., 07/09/95, Honolulu is high at 2:20 pm, -0.45 minutes at the eruption site and it becomes high tide at 1:35 pm).

The currents run parallel east to west along the coastline and the seas are usually choppy in the day and calming more by 5:00 pm. This is due to the fact that the trade winds also blow generally strong on or along shore during the day time and calm before dusk.

The moon phases are incorporated to show the relationship of gravitational pulls and tide heights. Could this also effect the amount of flux (volume) of magma/lava during full moons and or other planetary phases?

Included in this documentation are the meeting notes as provided by the Hawai'i Volcano Observatory (HVO) after meeting weekly with members of the Hawai'i Volcanoes National Park (HVNP). A vital part of my duties as a Park Ranger on the eruption site was to document the volcanic activity along the coast and to provide such information to HVO to help us in accessing safe areas in which to provide visitors to view such activity.


'ŌLA'A FOREST
WILDERNESS
AREA
Wright Road
Kīlauea Visitor Center
Volcano
Village
Volcano
House
KĪLAUEA
CALDERA
Thurston Lava Tube
(Nāhuku)
Crater Rim Drive
Chain of Craters Road
Lua Manu
Crater
Puhimau
Crater
Ko'oko'olau
Crater
4.0mi
6.4km
KAHAUALE'A NATURAL
AREA RESERVE
WILDERNESS
AREA
Pu'u Huluhulu
Pauahi
Crater
Nāpau
Trail
4.0mi
6.4km
Mauna Ulu
Lava Shield
Kāne Nui o Hamo
Lava Shield
Makaopuhi
Crater
2.0mi
3.2km
2mi
3km
Nāpau
Crater
Pu'u 'Ō'ō
EAST RIFT ZONE
Kupaianaha
Lava Shield
Kīpuka Kahāli'i
Mau Loa o
Mauna Ulu
Kalapana
Trail
Muliwai a Pele
Nāulu
Trail
2.0mi
3.2km
Kealakomo
Hālōna Kahakai
HŌLEI PALI
Alanui Kahiko
Hōiei
Pali
Pu'u Loa
0.7mi
1.1km
Black Sand
Beach
Project Sites
Wahaʻula
Helau
Kīpuka Nēnē
3.4mi
5.5km
2.0mi
3.2km
4.0mi
6.4km
HILINA PALI
Hilina
Pali
Trail
2.8mi
4.5km
Keauhou Trail
4.8mi
7.7km
Pu'u Kapukapu
1050ft
320m
PU'UEOA PALI
1.6mi
2.6km
1.6mi
2.6km
Keauhou Shelter
Hālāpē
Shelter
Puna Coast Trail
6.0mi
10.5km
Kaʻena Point
Āpua Point
PACIFIC OCEAN
Mountain View
PACIFIC OCEAN
Kohala
Honokaʻa
Kawaihae
Puʻukoholā
Heiau NHS
Waimea
Kaloko
Honokohau
NHP
Mauna Kea
Hilo
Kailua-Kona
ISLAND OF
HAWAI'I
Keaʻau
Glenwood
Mauna Loa
Volcano
Village
Pāhoa
Kīlauea
Puʻuhonua o
Hōnaunau
NHP
Pahala
Naʻalehu
* Sites
HAWAI'I VOLCANOES
NATIONAL PARK
0 10 Kilometers 50
0 10 Miles 50
0 1 Kilometer 5
0 1 Mile 5



10/5/95

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

TABLE OF CONTENTS (continued)

TABLE OF CONTENTS (continued)

BLACK SAND BEACH PROJECT DATA:

Date: 07/09/95

Project Day: 1.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	1:00 pm	1:03 pm	n/a	n/a	n/a
Film Roll #:	1.				
Photo(s)#:	12	13	n/a	n/a	n/a

Tides: 1:35 pm

Heights: 2.3 (h)

Moon: Right between first quarter and full moon.

Winds: Trades 20-25 mph. Air quality poor-bad, winds blow off shore by 5:00 pm.

Observations: First day working eruption duty again as a Park Ranger with Hawaii Volcanoes National Park (HVNP). Lava is entering into the ocean through a well defined tube system as much as thirty feet wide (per Hawaii Volcanoes Observatory or HVO geologists) in what they are terming to be the Highcastle area (refer to the map). Hugh steam plume obscured viewing of red lava entering into the ocean and no pyroclastics where observed. A well defined black sand beach had developed up to the sea cliffs (55-60 feet high) within the last two months according to park personnel and is now showing signs of erosion from high surf. All observations made from the Site Three/Four locations off of the "Makai Trail System" near the Panau Nui and Lae Apuki ahupua'a boundaries (refer to the map). Also per park staff there has been no surface flows observed anywhere for the last two weeks and the lava has been confined to the tube system at a rate of approximately 500,000 cubic meters per day.

HVO Meeting Notes: n/a

Site Location: One **Film Roll/Photo #**: (1)12

Site Location: Two **Film Roll/Photo #**: (1)13

Plate #: 1.

BLACK SAND BEACH PROJECT DATA:

Date: 07/10/95

Project Day: 2.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Film Roll #: n/a					
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Tides: 2:21 pm

Heights: 2.5 (h)

Moon: Two days before full moon (07/12/95).

Winds: Trades 15-20 mph. Air quality poor, winds blowing along and on shore like the previous day and switching by 5:00 pm.

Observations: Small surface flow observed at the approximate 1500 foot level of Pulama Pali at 6:00 pm. Per United States Geological Society (USGS) personnel coming out of the field, they informed me that there is a small surface flow near the coastline of Kamoamoa area (refer to the map) and was first observed by their staff the previous day (07/10/95). Per HVNP staff, the black sand beach at the Makai Trail" end had greatly built up to the cliff top level during the big south swell surf of two weeks ago and hitting all islands.

HVO Meeting Notes:

Geology: Not much change. Only the Highcastle entry is active now. Small breakout Thursday (07/06/95) on the flats and several breakouts on Pulama Pali at the 1200 foot level and further down. An over flight 07/06/95 to Pu'u 'O'O revealed that the pond is active as sloshing was heard. Nothing was seen as the area was "fumed in". Rockfalls are probably continuing, but no new evidence of collapse were seen at the rim or at the "Great Pit" on the west flank of the cone. On July 4, a HVO staff member in Kalapana observed a large cloud rising from the west side of the cone, probably from a rockfall.

Seismic: Kilauea summit is normal at 2-3000 small earthquakes per day. Counts are up a little on the East Rift Vone (ERZ).

HVO Meeting Notes: (continued)
Flux: Volume of lava measured at the tube at 2100 feet appeared to be elevated, but probably this is due to the tube backing up or filling up. Most likely the volume of the flow continues at about 500,000 cubic meters/day.

Gas: Sulphur dioxide was measured on the Chain of Craters Road where the plume from Pu'u 'O'O crosses it and at the summit (Halama'uma'u). Summit: 150-200 metric tons/day and 800 metric tons/day at the road site.

BLACK SAND BEACH PROJECT DATA:

Date: 07/11/95

Project Day: 3.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	3:07 pm	3:09 pm	n/a	n/a	n/a
Film Roll #:	1.				
Photo(s)#:	14	15	n/a	n/a	n/a

Tides: 3:04 pm

Heights: 2.5 (h)

Moon: One day before full moon.

Winds: Trades up to 30 mph. Plume blowing on and along shore.

Observations: No red lava seen all day or into the evening. High surf continues to erode away at the black sand beach, while the ocean entry continues to make more.

HVO Meeting Notes: n/a

Site Location: One **Film Roll/Photo #**: (1)14

Site Location: Two **Film Roll/Photo #**: (1)15

Plate #: 2.

BLACK SAND BEACH PROJECT DATA:

Date: 07/12/95

Project Day: 4.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	12:55 pm	12:58 pm	n/a	n/a	n/a
Film Roll #:	1.				
Photo(s)#:	16	17	n/a	n/a	n/a

Tides: 3:42 pm

Heights: 2.5 (h)

Moon: Full moon.

Winds: Trades 25-30, making the surf choppy.

Observations: The plume is obscuring any red lava viewing from the "Makai Trail" area. I hiked out over the active tube system of Highcastle and observed some red lava pouring into the ocean from the Kalapana side of the entry, most activity appears to be underwater and still making black sand in the pounding surf.

Note: The Highcastle black sand beach has expanded at least 50 yards more towards the South Point side and is much wider than when last observed during the preliminary field trip in April with Dr. Floyd McCoy.

HVO Meeting Notes: n/a

Site Location: One **Film Roll/Photo #**: (1)16

Site Location: Two **Film Roll/Photo #**: (1)17

Plate #: 3.

BLACK SAND BEACH PROJECT DATA:

Date: 07/13/95

Project Day: 5.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 4:29 pm

Heights: 2.4 (h)

Moon: One day after full moon.

Winds: No data collected.

Observations: No data collected due to being scheduled off.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 07/14/95

Project Day: 6.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 5:10 pm

Heights: 2.2 (h)

Moon: Two days after full moon.

Winds: No data collected.

Observations: No data collected due to being scheduled off.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 07/15/95

Project Day: 7.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	1:05 pm	1:07 pm	n/a	n/a	n/a
Film Roll #:	1.				
Photo(s)#:	18	19	n/a	n/a	n/a

Tides: 5:51 pm

Heights: 1.9 (h)

Moon: Three days after full moon.

Winds: Strong trades blowing offshore, fairly good air quality.

Observations: Red lava visible on Pulama Pali and at the ocean entry at 5:45 pm, most still in the tube system. Per HVNP staff, small surface flows were observed on the pali the last two nights (07/13-14/95) in which I was off duty. The flows being faint and starting from about 1200 foot level and making a path towards the Highcastle area. The USGS log book in the HVNP mobile headquarters indicated that the waves continued to erode away the black sand beach at the end of the "Makai Trail". In photo #19, one may be able to see such erosion on the Kalapana side and more of a build up on the South Point side.

HVO Meeting Notes: n/a

Site Location: One **Film Roll/Photo #**: (1)18

Site Location: Two **Film Roll/Photo #**: (1)19

Plate #: 4.

BLACK SAND BEACH PROJECT DATA:

Date: 07/16/95

Project Day: 8.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 6:31 pm

Heights: 1.7 (h)

Moon: Four days after full moon.

Winds: Trades 15-25 mph and blowing off shore.

Observations: No red lava visible. Hugh steam plume at the Highcastle ocean entry, the flux or volume appears to be about the same at 500,000 cubic meters/day.

There is a hurricane over 900 miles south and off of the South Point area, expecting to bring higher winds and waves later in the week. The surf continues to spread the black sand down the coast.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 07/17/95

Project Day: 9.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	4:34 pm	4:39 pm	n/a	n/a	n/a
Film Roll #: 1.					
Photo(s)#:	20	21	n/a	n/a	n/a

Tides: 7:12 pm

Heights: 1.4 (h)

Moon: Five days after full moon, two days to the last quarter.

Winds: Trades 25-30 mph.

Observations: Same conditions as the previous day (07/16/95), the hurricane is now 450 miles south of the island and the surf is choppy.

HVO Meeting Notes: Highcastle entry continues building the bench with intermittent small explosions. Repeated breakouts on top of Pulama Pali and down the face of the pali are sometimes visible after dark. A fairly sizable lava shield formation has built up in the area of the breakouts at about the 2000' level. A new skylight at about the 2450' was reported, it may be a site for a sampling and or new Tube Tattler. Pu'u 'O'O continues to experience rockfalls which are recorded on the Steam Cracks seismometer.

There was a breakout on the flats behind the Lae 'Apuki entry last week and this entry resumed briefly on July 12, but has now stopped. Surface flows were visible last night at the top of Pali uli behind the Lae 'Apuki area. Beach erosion at the current viewing area of the flow field has been very dramatic this past week.

HVO Meeting Notes: (continued)
Seismology: Counts remain very consistent with 2-3000 shallow long period earthquakes (EQs) at the summit and more on the East Rift Zone (ERZ).

Site Location: One **Film Roll/Photo #**: (1)20

Site Location: Two **Film Roll/Photo #**: (1)21

Plate #: 5.

BLACK SAND BEACH PROJECT DATA:

HURRICANE

Stu

Date: 07/18/95

Project Day: 10

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 7:58 pm

Heights: 1.2 (h)

Moon: One day before last quarter moon.

Winds: Strong during the early afternoon and calmed before evening. Sulfer dioxide from Pu'u 'O'O was real bad.

Observations: Don't know if the hurricane had anything to do with fumes blowing makai from Pu'u 'O'O, but as reported above it made for bad air quality at the coastline, instead of normally being blown towards South Point. The weather service down graded the status of the storm from hurricane to a tropical storm, but is calling for heavy rains by tomorrow. USGS staff coming out from the field reported a good size surface flow at 2100' of Pulama Pali and there was a good show of red during the evening. Could also see parts of the Kamoamoa flow and a good glow of the plume at the Highcastle ocean entry.

The beach continues to erode away at the "Makai Trail" area and shifting down towards by photo sites one/two.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 07/19/95

Project Day: 11.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	2:37 pm	2:39 pm	n/a	n/a	n/a
Film Roll #:	1.				
Photo(s)#:	22	23	n/a	n/a	n/a

Tides: 8:54 pm

Heights: 1.0 (h)

Moon: Last quarter moon.

Winds: Trades 20-40 mph, the plume blowing off shore and rained most of the day; on/off.

Observations: Flash flood watch posted at 2:00 for the big island (Hilo, Hamakua, Puna) and the tropical storm named Barbara has been down graded to a tropical disturbance as it moves westerly away from the islands. Despite the weather there was good views of the surface flows up on the pali. Per USGS, the flows are approximately 40 minutes past Highcastle. The plume continues to glow during the evening and shows some surface lava pouring into the ocean; again most of it is going in from underneath the water. The beach continues to erode and shift down the coast.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 07/20/95

Project Day: 12.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 11:27 am

Heights: 1.7 (h)

Moon: One day after the last quarter moon.

Winds: No data collected.

Observations: No data collected due to being scheduled off.

HVO Meeting Notes: n/a

Site Location: One **Film Roll/Photo #**: (1)22

Site Location: Two **Film Roll/Photo #**: (1)23

Plate #: 6.

BLACK SAND BEACH PROJECT DATA:

Date: 07/21/95

Project Day: 13.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 12:36 pm

Heights: 1.8 (h)

Moon: Two days after the last quarter moon.

Winds: No data collected.

Observations: No data collected due to being scheduled off.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 07/22/95

Project Day: 14.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	1:50 pm	1:52 pm	n/a	n/a	n/a
Film Roll #:	2.				
Photo(s)#:	1	2	n/a	n/a	n/a

Tides: 12:56 pm

Heights: 1.9 (h)

Moon: Three days after the last quarter moon.

Winds: Variable, light. The plume is half it's normal size and blowing along/off shore.

Observations: As indicated above, the plume indicates that there is less volume of lava in the tube and more on the surface. Able to see a good surface flow out past Highcastle about one-fourth of a mile wide and approximately 100-150 yards from the ocean.

Checked out a skylight about 150 yards makai of the Mo'o Lehua (Jason) flow and below Pali Uli. Could observe lava slowly moveing through it and it was extremely hot. Experienced the ground settling from the magma movement beneath. Due to the toxic vapors, one is required to wear a respirator.

Not much surf activity, but the beach continues to erode and to shift down the coastline.

Note: Photos 3-16 are skylight shots.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 07/23/95

Project Day: 15.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 1:32 pm

Heights: 2.0 (h)

Moon: Four days after the last quarter moon.

Winds: No data collected.

Observations: Not much change in activity, unable to see any red surface flows until dark. Good views on top Pulama Pali, no new ocean entry at the Kamoamoa area as anticipated from the surface flow in that area of yesterday.

The beach continues to erode at a slow pace.

HVO Meeting Notes: n/a

Site Location: One **Film Roll/Photo #**: (2)1

Site Location: Two **Film Roll/Photo #**: (2)2

Plate #: 7.

BLACK SAND BEACH PROJECT DATA:

Date: 07/24/95

Project Day: 16.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	1:18 pm	1:20 pm	n/a	n/a	n/a
Film Roll #: 2.					
Photo(s)#:	17	18	n/a	n/a	n/a

Tides: 1:56 pm

Heights: 2.1 (h)

Moon: Five days after the last quarter moon.

Winds: Trades, blowing on shore. The air quality is fairly good.

Observations: No surface flow observed during the day time. Very little red observed on Pulama Pali as compared to the last couple of nights. It has crusted or slowed in volume, for there is no increase in plume size from channelling from the source (Pu'u 'O'O).

No significate change in coastal conditions.

HVO Meeting Notes:

Geology: There are two active surface flows on the coastal plain. One is a breakout from the Kamoamoa tube with several very fluid blue glassy flows, but the leading edge seems to be stagnant now. The other is below Pali Uli and is currently engulfing the Thanksgiving (1994) Kipuka.

The Highcastle entry continues. A lower bench is forming about 15 meters wide makai of the 100m meter wide bench already built out from the old sea cliffs. There is a stranded littoral cone and explosive debris slightly mauka of the entry. A skylight has developed on the coastal plain about 100-150 m makai of pali in the Jason flow area. The tube continues to leak on Pulama Pali with flows visible at night.

HVO Meeting Notes: (continued)

An overflight of Pu'u 'O'O last Tuesday (07/18/95) showed no major changes. There is a new, but inaccessible skylight at 2450' - the roof is only one foot thick all around it. Once it collapses further, it might be a site for sampling lava, gas and temperatures.

The project measuring the hummocky pahoehoe fields at Highcastle continues. Time lapse photography of tumulus building is on hold now as the cameras are being deployed upslope now.

Seismic: Summit and ERZ readings are steady with a small increase last week of shallow long period EQs. Last night from 5 to 6 pm, there was an episode of deep tremor which excited the whole network of seismic stations island wide. This was too low to be felt and is not unusual. Probably caused by magma movement under Kilauea summit and to the southwest of the summit.

Deformation: Measurements of the island show the movement of Kilauaea's South Flank has increased to 9 cm per year at the coast, back to the 1992 levels. There is a little more movement on the lower ERZ, but not analyzed yet. Doesn't look like inflation, however.

BLACK SAND BEACH PROJECT DATA:

Date: 07/25/95

Project Day: 17.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 2:37 pm

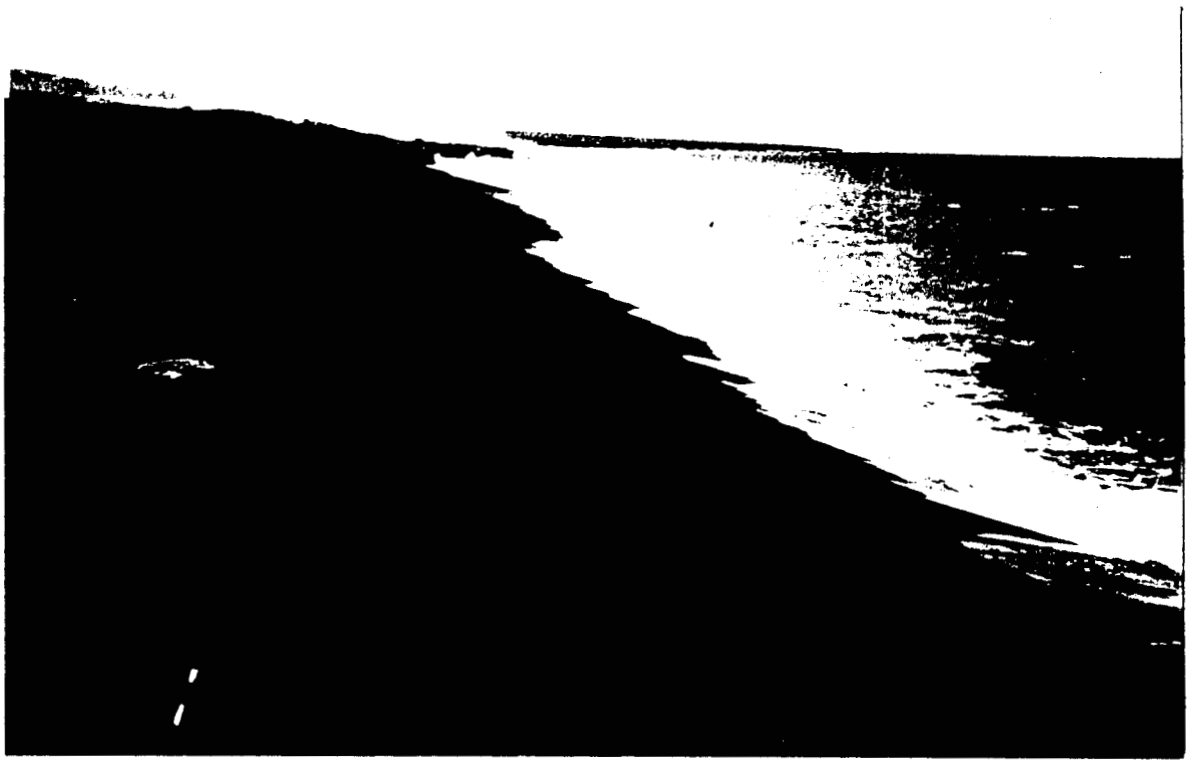
Heights: 2.2 (h)

Moon: Six days after the last quarter moon, two before full moon.

Winds: No data collected.

Observations: All conditions remain the same, no red lava viewing until dark on Pulama Pali and at the ocean entry. The surface flows out by Kamoamoa have not entered the ocean yet; no new plume observed in that area or others.

HVO Meeting Notes: n/a



Site Location: One **Film Roll/Photo #**: (2)17

Site Location: Two **Film Roll/Photo #**: (2)18

Plate #: 8.

BLACK SAND BEACH PROJECT DATA:

Date: 07/26/95

Project Day: 18.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 3:08 pm

Heights: 2.2 (h)

Moon: One day before new moon.

Winds: Trades blowing strong and along shore, air quality is real bad from the plume.

Observations: This was a scheduled day to photograph sites one/two, but I was unable to do so. Hiked up to the skylight and observed lava moving at a rate of approximately one foot a second in the tube system.

Due to the extremely poor air quality along the coastline I was unable to make any observations on the erosional impacts on the black sand beaches.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 07/27/95

Project Day: 19.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 3:38 pm

Heights: 2.2 (h)

Moon: New moon.

Winds: No data collected.

Observations: No data collected due to scheduled day off.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 07/28/95

Project Day: 20.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 4:09 pm

Heights: 2.1 (h)

Moon: One day after the new moon.

Winds: No data collected.

Observations: No data collected due to scheduled day off.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 07/29/95

Project Day: 21.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	3:07 pm	3:09 pm	n/a	n/a	n/a
Film Roll #: 2.					
Photo(s)#:	22	23	n/a	n/a	n/a

Tides: 4:40 pm

Heights: 2.0 (h)

Moon: Two days after the new moon.

Winds: Trades blowing moderate off shore, very little plume.

Observations: Returned to work to discover that the plume had shut down yesterday, but it still had some lava draining into the ocean from the tube system. Per HVNP staff, there was also very little red showing on the pali during the evening the last two nights. Very little observed during the evening, appears to be a'a' lava from our vantage point (approximately two miles away

Note: Finished film roll #2 at the skylight. Activity greatly slowed down within the tube and showing signs of breaking open. Also hiked to the Highcastle ocean entry, no red lava observed; but discovered a new skylight at the sea cliff drop off - unable to see any moving lava.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 07/30/95

Project Day: 22.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 5:12 pm

Heights: 1.9 (h)

Moon: Three days after the new moon.

Winds: Trades blowing moderate off shore.

Observations: The plume continues to be light, no red (glow) until the evening hours.

The beach slowly continues to erode, not being replaced due to very little volume entering the ocean.

HVO Meeting Notes: n/a

Site Location: One Film Roll/Photo #: (2)22

Site Location: Two Film Roll/Photo #: (2)23

Plate #

BLACK SAND BEACH PROJECT DATA:

Date: 07/31/95

Project Day: 23.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	4:42 pm	4:44 pm	n/a	n/a	n/a
Film Roll #: 3.					
Photo(s)#:	1	2	n/a	n/a	n/a

Tides: 5:46 pm

Heights: 1.7 (h)

Moon: Four days after the new moon.

Winds: Trades blowing light off shore.

Observations: Had another light plume approximately 20-40 yards on the Kalapana side of the Highcastle plume. Indication of a surface flow hitting the ocean or diversion of the tube system.

HVO Meeting Notes: Highcastle entry diminished on Friday (07/28), but picked up again later that night. HVO staff wonders if episodes of deep tremor like the one reported last week are associated with later pauses. The day after this recent tremor episode there was a breakout at the 2250' which had died a few days later. Further down the system other breakouts have been noted. There is an inflating area at the base of Pali Uli on the Lae 'Apuki flow. At the entry area a lower bench had formed and then disappeared last week. Estimated area: 10m x 80m. Visitors reported a collapse (with a crack sound, earth movement and explosions) on Friday night about 11:00 pm.

HVO Meeting Notes: (continued)

Pu'u 'O'O lava pond was viewed from the air for the first time in weeks and it was estimated that the pond is smaller and deeper than usual, less that 30m in diameter and 100m deep. The 2450' skylight was noted from the air to have active flow, but this area (episode 53 shield) is too dangerous to approach by land.

Seismic: On Kilauea, the Steam Cracks seismometer had been registering a few "bursts" which are interpreted as either gas pistoning or rockfalls inside of Pu'u 'O'O.

Geophysics: The flux as of 07/18 ia about the same at 500,000 cubic meters/day.

Deformation: They are leveling on the lower ERZ to bring the baseline up to date. Recent global positioning systems (GPS) survey shows that Mauna Loa (ML) is about the same as before except the summit is rising. Kilauaea's summit is dropping and the South Flank is moving again at a rate of 9cm/yr seaward.

BLACK SAND BEACH PROJECT DATA:

Date: 08/01/95

Project Day: 24.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 6:24 pm

Heights: 1.5 (h)

Moon: Five days after the new moon.

Winds: Moderate trades blowing mostly off shore. Light plume.

Observations: Able to see small drips of red lava pouring into the ocean at the Highcastle entry and some small out breaks on the pali.

Hiked out to the inland skylight and could not observe any movement of lava in the tube system. The creation of black sand at the entry point is almost non-existant due to such a low volume and surface flows.

HVO Meeting Notes: n/a

Site Location: One **Film Roll/Photo #**: (3)1

Site Location: Two **Film Roll/Photo #**: (3)2

Plate #: 10.

BLACK SAND BEACH PROJECT DATA:

Date: 08/02/95

Project Day: 25.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	6:15 pm	6:17 pm	n/a	n/a	n/a
Film Roll #: 3.					
Photo(s)#:	3	4	n/a	n/a	n/a

Tides: 7:09 pm

Heights: 1.3 (h)

Moon: One day before the first quarter moon.

Winds: Trades blowing normal on and along shore.

Observations: Per HVNP volunteer, a hugh surface flow was observed later in the evening on the previous night (08/01).

Upon arrival at the coastline at 12:30 pm, the plume was small; but it picked up to its normal output about an hour later. No red lava observed at the ocean entry, but by dusk (5:30 pm) a hugh surface flow was observed forking off of Pulama Pali towards the Kamoamoa/Lae 'Apuki side and the other coming more in our location at Panau Nui/Lae 'Apuki boundary. It definately appears that the volume has increased at Pu'u 'O'O, increasing in surface flows and a rejuvenation of the Highcastle tube. Perhaps new black sand created will help to prevent the continued erosion of such at the end of the "Makai Trail".

HVO Meeting Notes: n/a

Site Location: One **Film Roll/Photo #**: (3)3

Site Location: Two **Film Roll/Photo #**: (3)4

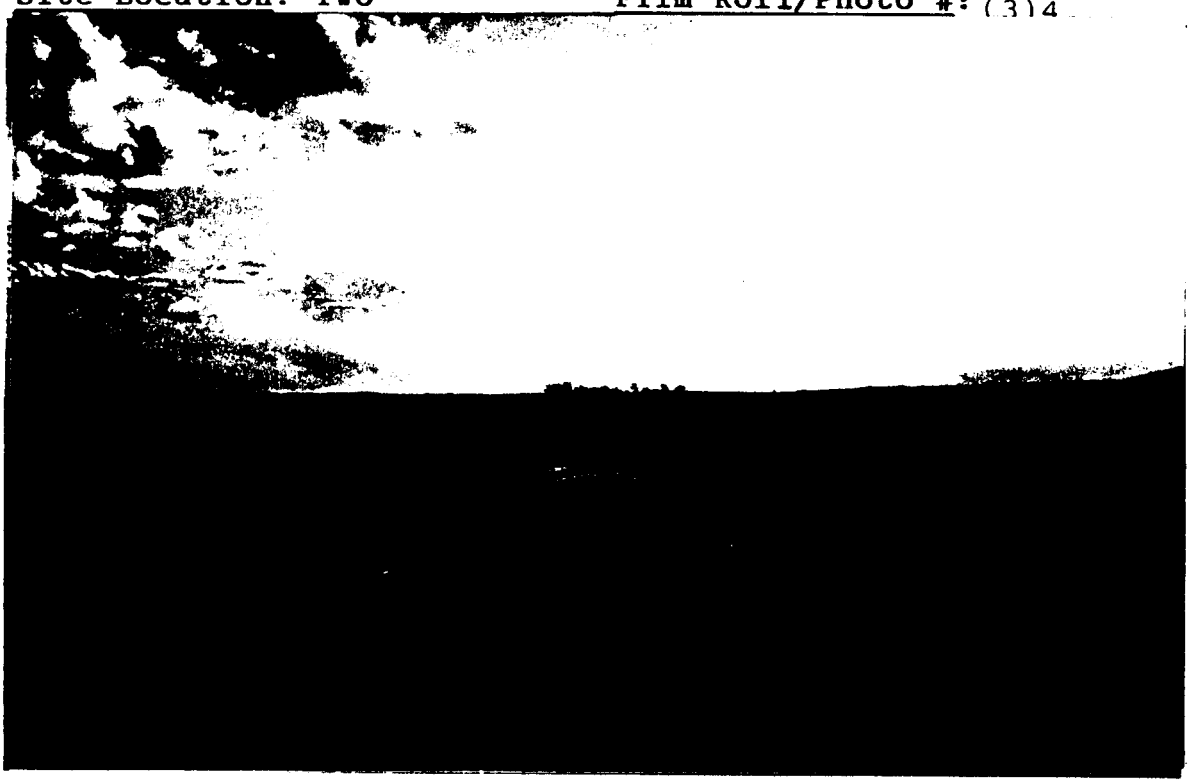


Plate #: 11.

BLACK SAND BEACH PROJECT DATA:

Date: 08/03/95

Project Day: 26.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 8:08 pm

Heights: 1.1 (h)

Moon: First quarter moon.

Winds: Trades blowing moderate on shore.

Observations: Fairly good size plume, volume appears to be back to the normal output. Seas fairly calm, not much effect upon the black sand beaches.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 08/04/95

Project Day: 27.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 10:36 am and 9:30 pm

Heights: 1.9 (h) and 0.9 (h)

Moon: One day after the first quarter moon.

Winds: No data collected.

Observations: No data collected due to scheduled day off.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 08/05/95

Project Day: 28.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Tides: 11:37 am and 10:58 pm

Heights: 2.1 (h) and 0.9 (h)

Moon: Two days after the first quarter moon.

Winds: No data collected.

Observations: No data collected due to scheduled day off.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 08/06/95

Project Day: 29.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	4:30 pm	4:32 pm	n/a	n/a	n/a
Film Roll #: 3.					
Photo(s)#:	5	6	n/a	n/a	n/a

Tides: 1:16 pm

Heights: 2.3 (h)

Moon: Three days after the first quarter moon.

Winds: Trades light and the plume blowing directly off shore.

Observations: Able to see red lava at the plume pouring into the water, but it was very little bit.

Hiked up to the mauka skylight and could not observe any lava moving through the tube system and feeding the ocean entry; the volume appears to have slowed down.

The beach continues to erode away at the "Makai Trail" area and move down towards my photo sites one/two. Shots from site one would actually show the build up in between the two spots.

Note: Video taped the skylight and the Highcastle plume area.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 08/07/95

Project Day: 30.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Film Roll #: n/a					
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Tides: 1:38 pm

Heights: 2.4 (h)

Moon: Four days after the first quarter moon.

Winds: Trades fairly strong and blowing on shore, had to evacuate the area for over an hour due to very bad air quality.

Observations: The volume in the tube system seemed to have picked up considerably and or the winds concentrated the plume in our direction.

Observed steam rising from the May 7 bench creation and on the Kalapana side of the "Makai Trail" area. Other HVNP personnel thought that a new tube had opened up, but I confirmed that the surf had removed the black sand piled on top of the bench in which is still very hot. The sand had also heated up from the steam and was extremely hot about two inches down. Four months after this volcanic activity and its quiet hot still, but now that the sand is being eroded away - it should cool much faster as it is being washed by the waves.

Note: USGS was down at the coastline and looking at the tube system with infra-red cameras, so I asked them to take a look at the coastline where the steam was rising. As I expected there was no lava movement under ground, the bench was just cooling off.

HVO Meeting Notes: n/a

Site Location: One **Film Roll/Photo #**: (3)5

Site Location: Two **Film Roll/Photo #**: (3)6

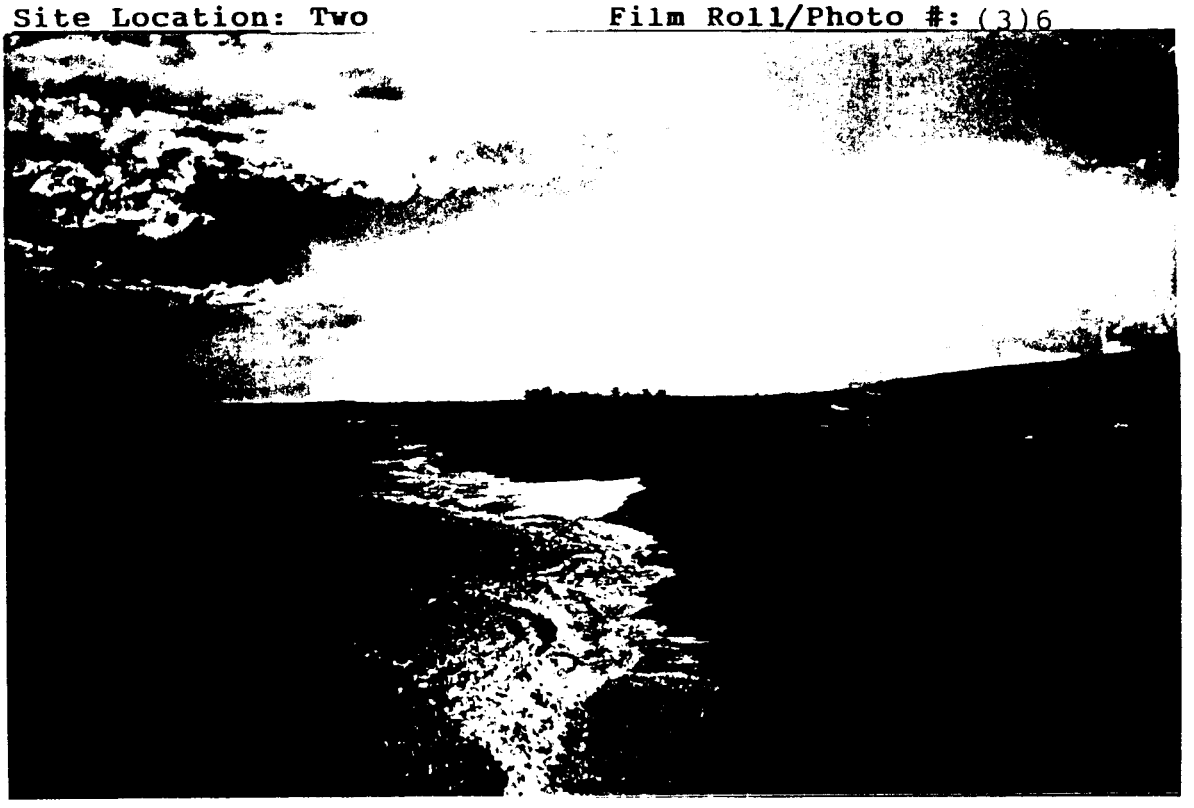


Plate #: 12.

BLACK SAND BEACH PROJECT DATA:

Date: 08/08/95

Project Day: 31.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	4:40 pm	4:42 pm	n/a	n/a	n/a
Film Roll #: 3.					
Photo(s)#:	7	8	n/a	n/a	n/a

Tides: 2:02 pm

Heights: 2.5 (h)

Moon: Five days after the first quarter moon, two before full.

Winds: Trades blowing 30 mph, both along and on shore.

Observations: The beach is getting more eroded and shifting down towards sites one/two. Checked the sand on top the May 7 bench, Kalapana side of the "Makai Trail" and it is still very hot and exposing the pahoehoe.

HVO Meeting Notes: n/a

Site Location: One Film Roll/Photo #: (3)7

Site Location: Two Film Roll/Photo #: (3)8

Plate #:13.

BLACK SAND BEACH PROJECT DATA:

Date: 08/09/95

Project Day: 32.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 2:44 pm

Heights: 2.4 (h)

Moon: One day before full moon.

Winds: No data collected.

Observations: No data collected due to taking off.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 08/10/95

Project Day: 33.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 3:29 pm

Heights: 2.4 (h)

Moon: Full moon

Winds: No data collected.

Observations: No data collected due to scheduled day off.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 08/11/95

Project Day: 34.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Tides: 4:02 pm

Heights: 2.2 (h)

Moon: One day after full moon.

Winds: No data collected.

Observations: No data collected due to scheduled day off.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 08/12/95

Project Day: 35.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 4:39 pm

Heights: 2.0 (h)

Moon: Two days after full moon.

Winds: No data collected.

Observations: No data collected due to taking off.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 08/13/95

Project Day: 36.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	2:20 pm	2:22 pm	n/a	n/a	n/a
Photo(s)#:	10	11	n/a	n/a	n/a

Film Roll #: 3.

Tides: 5:15 pm

Heights: 1.8 (h)

Moon: Three days after the full moon.

Winds: Strong trades blowing mostly off shore, light plume.

Observations: It's my first day back after being off for the last four days and HVNP staff inform me that there is a hugh surface flow moving towards the Kalapana side of Pulama Pali. Also informed that there is a new skylight above Pali Uli and on Pulama Pali (no elevation given). I was informed that given the route of the flow it should hit the Waha'ula Heiau in the next two days. Later, I had an opportunity to take a helicopter ride over the flow to investigate the lavas path towards the historical site and sensitive native habitats of sandlewood. From my perspective it looked as if the pahoehoe flow could in fact move towards Waha'ula, but most likely would go more towards the South Point side of it. Fire crews put in to the native forest stands (kipuka) to help divert fire from jumping over into this unique habitat.

I checked the black sand on the May 7th bench and found that the surf had indeed cooled it, no steam observed.

HVO Meeting Notes: n/a

Site Location: One Film Roll/Photo #: (3)10

Site Location: Two Film Roll/Photo #: (3)11

Plate #: 14.

BLACK SAND BEACH PROJECT DATA:

Date: 08/14/95

Project Day: 37.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 5:51 pm

Heights: 1.5 (h)

Moon: Four days after the full moon.

Winds: Trades mostly off shore.

Observations: There are now two separate steam plumes approximately twenty yards apart, but very small. The volume appeared to be very small until about 2:30 pm, when large explosions (possible bench collapses) occurred and the steam plume got much bigger.

Fire crews reported that the lava flow is just past the old Highcastle/ Lae 'Apuki area of last years (July/August) flows and that the surface volume is massive. I will have to check it out tomorrow, perhaps we could take visitors closer.

At dusk we could observe the flows going towards the coast and a finger coming our way. The flow may even come our way in the next week or two if this keeps up.

The beach at the "Makai Trail" end continues to erode and is now showing sea arches on the South Point side. This eruption is definitely not replacing the black sand from the Highcastle plume for most of the volume appears to be on the surface.

(continued below)

HVO Meeting Notes: n/a

Observations: (continued)

The plumes eventually shut down to one point by 5:30 pm and was very light (very little volume), but one hour later we had some good pyroclastic explosions. Up to that point there was no red lava observed at the ocean entry all day.

BLACK SAND BEACH PROJECT DATA:

Date: 08/15/95

Project Day: 38.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	3:10 pm	3:13 pm	n/a	n/a	n/a
Film Roll #: 3					
Photo(s)#:	12	13	n/a	n/a	n/a

Tides: 6:31 pm

Heights: 1.3 (h)

Moon: Five days after the full moon.

Winds: Trades blowing 15-25 mph on and along shore.

Observations: No red lava visible all day, until the evening. Per USGS personnel, a hugh surface flow had broke out on Pulama Pali during the day and that the mauka skylight had opened up much bigger. I hiked up to investigate and it was not that much bigger in diameter and no lava was observed flowing through it. The surface flow appeared to be pooling above Pali Uli and is taking most of the volume from the tube system. Perhaps a new tube is being made and the Highcastle tube is draining off?

The beach is definitely being eroded away by the surf.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 08/16/95

Project Day: 39.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	2:13 pm	2:13 pm	n/a
Film Roll #: 3.					
Photo(s)#:	n/a	n/a	15	16	n/a

Tides: 7:14 pm

Heights: 1.1 (h)

Moon: One day before the last quarter moon.

Winds: Trades 15-25 mph off shore.

Observations: No red lava visible at all.
Started taking photos of the erosional impacts at the end of the "Makai Trail", sites three and four. The sea arches are becoming much more noticeable and the sands are shifting down.

Note: I also video taped the new sites at 2:21 pm.

HVO Meeting Notes: n/a

Site Location: One Film Roll/Photo #: (3)12

Site Location: Two Film Roll/Photo #: (3)13

Plate #: 15.

Site Location: Three

Film Roll/Photo #: (3)15

Site Location: Four

Film Roll/Photo #: (3)16

Plate #: 16.

BLACK SAND BEACH PROJECT DATA:

Date: 08/17/95

Project Day: 40.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 8:17 pm and 9:45 am

Heights: 1.0 (h) and 1.6 (h)

Moon: Last quarter moon.

Winds: No data collected.

Observations: No data collected due to scheduled day off.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 08/18/95

Project Day: 41.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 10:39 am

Heights: 1.7 (h)

Moon: One day after the last quarter moon.

Winds: No data collected.

Observations: No data collected due to scheduled day off.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 08/19/95

Project Day: 42.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	4:19 pm	4:21 pm	n/a	n/a	n/a
Film Roll #: 3.					
Photo(s)#:	18	19	n/a	n/a	n/a

Tides: 11:35 am

Heights: 1.8 (h)

Moon: Two days after the last quarter moon.

Winds: No data collected.

Observations: Per HVNP staff, the lava flow (pahoehoe) had come over Pali Uli on 08/17 an about ten different falls and about three falls on 08/18. The flows are on the Kalapana side of Pali Uli and is going towards Waha'ula Heiau again, lots of surface activity. I hiked out to the steaming vent area along the South Point side of Pali Uli and came across a surface flow of pahoehoe, which had advanced approximately 250-300 yards down upon the flats and heading towards the plume and the roads end (05/07/95 flow). My guess, given the volume on the surface and the obstacles or depressions; it will take about one week to reach us if it doesn't stop like the last flow did.

I hiked up to the lava flow (pahoehoe) and witnessed the making of a tumuli and a tree mold. Got both on video.

The beach continues to erode and undercut along the "Makai Trail" area to the point that we closed it down to the public for viewing; plus the archeological sites were being disturbed. New trail established about 100 yards off the end of the road.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 08/20/95

Project Day: 43.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Film Roll #: n/a					
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Tides: 12:21 pm

Heights: 1.9 (h)

Moon: Three days after the last quarter moon.

Winds: Trades blowing mostly on shore all day, poor air quality. Wind speed 15-25 mph.

Observations: The plume size slowed down considerably a couple of times through out the day, indicating less volume of lava running out into the ocean (i.e., less black sand).

The lava flows had advanced down upon the flats another 100-150 yards since yesterday and during the evening there was good views of it going over Pali Uli.

The beach continues to erode away and shift down the coast.

HVO Meeting Notes: n/a

Site Location: One Film Roll/Photo #: (3)18

Site Location: Two Film Roll/Photo #: (3)19

Plate #: 17.

BLACK SAND BEACH PROJECT DATA:

Date: 08/21/95

Project Day: 44.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	3:52 pm	3:54 pm	3:42 pm	3:43 pm	n/a
Film Roll #:	3.				
Photo(s)#:	22	23	20	21	n/a

Tides: 1:00 pm

Heights: 2.0 (h)

Moon: Four days after the last quarter moon.

Winds: Trades blowing on shore 15-25 mph.

Observations: No red lava viewing from our perspective, but fire crews employed three helicopters to put in a black line in the area of the sandlewood forest, Kalapana side of Pulama Pali. It is unknown how far the lava had advanced down the coast on that side, whereas the flow over Pali Uli had crusted over and stopped. Per a geologist out in the field, Pu'u 'O'O is starting to shut down, very little ponding of lava in Vent 53. Vent 51 is still active at this time. The area has been very unstable and the ground is shaking all over due to the minor earthquakes. USGS is not conducting any ground operations, their equipment gets swallowed up by the constant shifting of cracks. The area has been cloudy lately, but by using infra-red, they have determined that Pu'u 'O'O still has a pond inside and that the walls were observed to be shaking as well; a very scary experience.

HVO Meeting Notes:

Geology: Breakouts from the 1600 foot level continue to flow both on the east side of the Kamoamoa field and above Highcastle. The eastern breakout, the larger of the two, continues to cover the lower parts of the kipuka between the Kamoamoa and the Waha'ula fields, including the remaining segments of the Chain of Craters Road in the kipuka. On the west end, Thursday's (08/17/95) breakout soon cascaded over Pali Uli and continued to do so late as of Sunday (08/20/95) night. Above Pulama Pali a small breakout appeared slightly above and to the west of the Jason (Mo'o Lehua) flow source, but this appears to have stagnated. Observed drops in activity earlier suggest that there may have been a mini-pause in the eruption between the 15th and the 17th, and that the current outbreaks are related to the usual surge following a pause. Recordings at the "Tube Tattler" have not been checked to verity this.

HVO Meeting Notes: (continued)

A large skylight at the 2450' level revealed a lava stream 15 or more yards wide, estimated to be flowing at about half a yard per second. The stream level appeared to have been somewhat lower than observed the previous week.

Site Location: One Film Roll/Photo #: (3)22

Site Location: Two Film Roll/Photo #: (3)23

Plate #: 18.

Site Location: Three Film Roll/Photo #: (3)20

Site Location: Four Film Roll/Photo #: (3)21

Plate #: 19.

BLACK SAND BEACH PROJECT DATA:

Date: 08/22/95

Project Day: 45.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 1:34 pm

Heights: 2.1 (h)

Moon: Five days after the last quarter moon.

Winds: Light trades blowing off shore.

Observations: Very little red lava observed pouring into the ocean from the Highcastle tube system.

The beach continues to erode and build up further down the coastline.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 08/23/95

Project Day: 46.

Site Location(s):	One	Two	Three	Four	Five
Time:	4:49 pm	4:51 pm	n/a	n/a	n/a
Photo(s)#:	26	27	n/a	n/a	n/a

Film Roll #: 3.

Tides: 2:05 pm

Heights: 2.1 (h)

Moon: Two days before the new moon.

Winds: No data collected.

Observations: Arrived on scene 12:45 pm and discovered that the plume had completely disappeared, the lava had shut down and its now in a pause. Per HVO staff, it had shut down at Pu'u 'O'O at 10:00 am yesterday (08/23). There is very little steam rising off of the ocean entry bench, the surf has greatly cooled the surface. Also per HVO, there is no surface flows anywhere.

The beach continues to erode and nothing is being replaced; we are now in a full fledged pause of activity.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 08/24/95

Project Day: 47.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 2:36 pm

Heights: 2.1 (h)

Moon: One day before the new moon.

Winds: No data collected.

Observations: No data collected due to scheduled day off.

HVO Meeting Notes: n/a

Site Location: One **Film Roll/Photo #**: (3)26

Site Location: Two **Film Roll/Photo #**: (3)27

Plate #: 20.

BLACK SAND BEACH PROJECT DATA:

Date: 08/25/95

Project Day: 48.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 3:06 pm

Heights: 2.1 (h)

Moon: New moon.

Winds: No data collected.

Observations: No data collected due to scheduled day off.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 08/26/95

Project Day: 49.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	3:17 pm	3:19 pm	n/a	n/a	n/a
Film Roll #: 3.					
Photo(s)#:	28	29	n/a	n/a	n/a

Tides: 3:37 pm

Heights: 2.0 (h)

Moon: One day after the new moon.

Winds: Trades blowing 20-25 mph off shore.

Observations: Per HVNP staff, the eruption is still in a pause. There was no activity the last two days in which I was off (08/24 & 25/95).

The tides are definitely high and the seas are chopped, and the beaches continue to erode and build up down the coastline.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 08/27/95

Project Day: 50.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 4:08 pm

Heights: 1.9 (h)

Moon: Two days after the new moon.

Winds: No data collected.

Observations: No data collected due to taking sick leave off.

HVO Meeting Notes: n/a

Site Location: One Film Roll/Photo #: (3)28

Site Location: Two Film Roll/Photo #: (3)29

Plate #: 21.

BLACK SAND BEACH PROJECT DATA:

Date: 08/28/95

Project Day: 51.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	4:04 pm	4:06 pm	5:17 pm	5:17 pm	n/a
Film Roll #:	3.				
Photo(s)#:	30	31	32	33	

Tides: 4:37 pm

Heights: 1.7 (h)

Moon: Three days after the new moon.

Winds: Very light trades.

Observations: The tube system at Highcastle is still shut down, there is no steam plume. Its been raining the last two days (08/26&27/95) and steam can be observed rising off of last years (July/August) surface flows out by Kamoamoa and the development of the new point of land by Lae 'Apuki (old Highcastle area).

Due to the low cloud cover a surface flow was observed at 3:20 pm at the top of Pulama Pali. A visitor in the area reported that he had observed such the flow sometime yesterday afternoon and into the evening (no time element collected).

The beach continues to erode away and there is a 20-25 foot cliff at the end of the "Makai Trail" (refer to photos three/four)

HVO Meeting Notes:

Geology: Through most of Tuesday (22nd) the Highcastle entry was strong. That night about 10:00 pm, the eruption paused and there was no plume or flows for the next few days. On Wednesday (23rd) the 2450' elevation skylight was observed to be empty. On Friday morning the 25th a breakout was spotted at the 2200' level on the west side of the flow field and a sluggish flow was noted in the 2450' skylight. It was determined that the eruption had resumed at about 8:00 am on that day. As late as Sunday (27th) and Monday (28th) afternoon streams of lava were visible high on Pulama Pali, including that the old tube system has not been re-occupied on Pulama Pali.

HVO Meeting Notes: (continued)

During the course of the pause the level of the Pu'u 'O'O pond fluctuated from about 33' below recent pond crust on the 22nd, to a level above the crust on the 25th. Normally circulation in the pond is from west to east, but on the 25th it was toward the west edge.

Geophysics: Recent flow measurements show that the volume has been fairly constant at 500,000 cubic meters (650,000 cubic yards) per day.

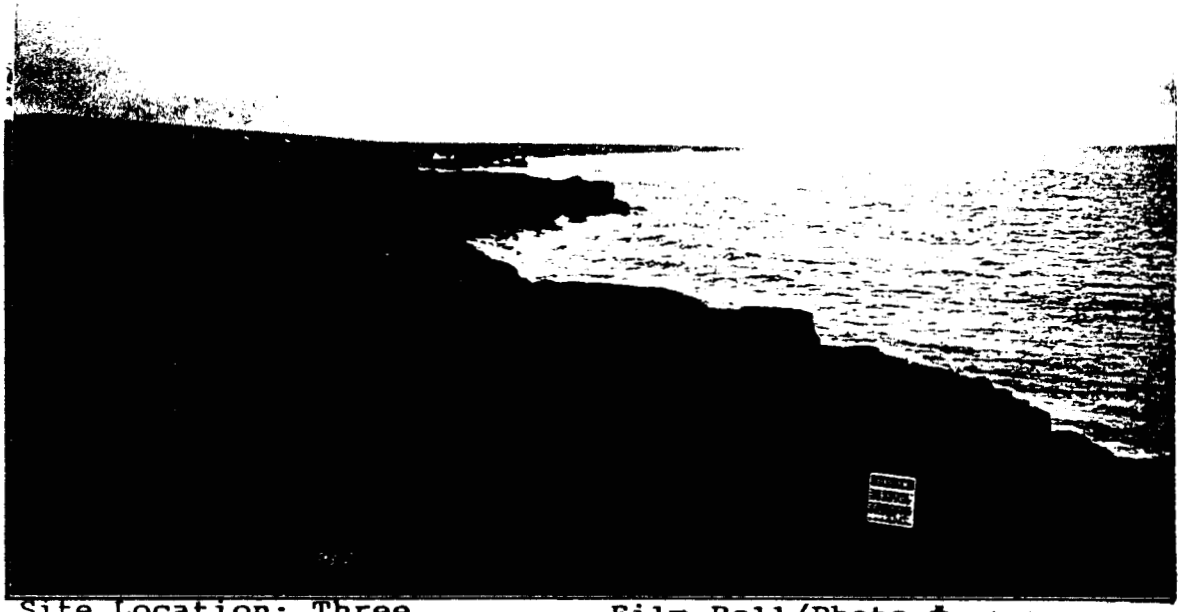
Deformation: 1994-95 leveling figures along two lines on the lower East Rift Zine from Pahoa eastward, as compared with 1989 figures, show a broad zone of subsidence of a few centimeters running parallel to the rift zone. This is interpreted to be the result of continuing slump of the south flank.

Note: There is evidence that the Kane nui o Hamo eruption (that produced the flows at the current end of the Chain of Craters Road some 500-750 years ago) lasted for about 50-60 years. Which raises questions about how long the current eruption might continue.

Site Location: One **Film Roll/Photo #**: (3)30

Site Location: Two **Film Roll/Photo #**: (3)31

Plate #: 22.



Site Location: Three Film Roll/Photo #: (3)32

Site Location: Four Film Roll/Photo #: (3)33

Plate #: 23.

BLACK SAND BEACH PROJECT DATA:

Date: 08/29/95

Project Day: 52.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 5:18 pm

Heights: 1.5 (h)

Moon: Four days after the new moon.

Winds: No data collected.

Observations: The tube system appears to have completely shut down at Highcastle and all of the volume from Pu'u 'O'O is on the surface of Pulama Pali. There is a hugh a'a flow on the eastern side, inter-mixed with scattered pahoehoe. Reports from HVO staff indicate that the a'a flow is at the 700' level (the top of Pali Uli is 200' high). It seems to be advancing fairly quick and may be over Pali Uli in a day or two; I will have to check it out if possible.

Coastal conditions remain the same, erosion and dispersal of black sand in process.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 08/30/95

Project Day: 53.

Site Location(s):	One	Two	Three	Four	Five
Time:	1:43 pm	1:45 pm	n/a	n/a	n/a
Photo(s)#:	34	35	n/a	n/a	n/a

Film Roll #: 3.

Tides: 6:00 pm

Heights: 1.3 (h)

Moon: Five days after the new moon.

Winds: Trades blowing 20-25 mph on shore.

Observations: The a'a flow has advanced to the 400' level and is heading towards Kamaomoa. A visiting geology student informed me that the flow was channelling 3 meters (over 3') per second in one particular area.

There is still no plume/lava activity at the Highcastle entry, probably shut down for good and a new channel will occur several miles away in the old flow fields.

Again, the black sand beach continues to erode and rebuild up further down the coast.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 08/31/95

Project Day: 54.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 6:52 pm

Heights: 1/1 (h)

Moon: Two days before the first quarter moon (09/02/95).

Winds: No data collected.

Observations: No data collected due to scheduled day off.

HVO Meeting Notes: n/a

Site Location: One Film Roll/Photo #: (3)34

Site Location: Two Film Roll/Photo #: (3)35

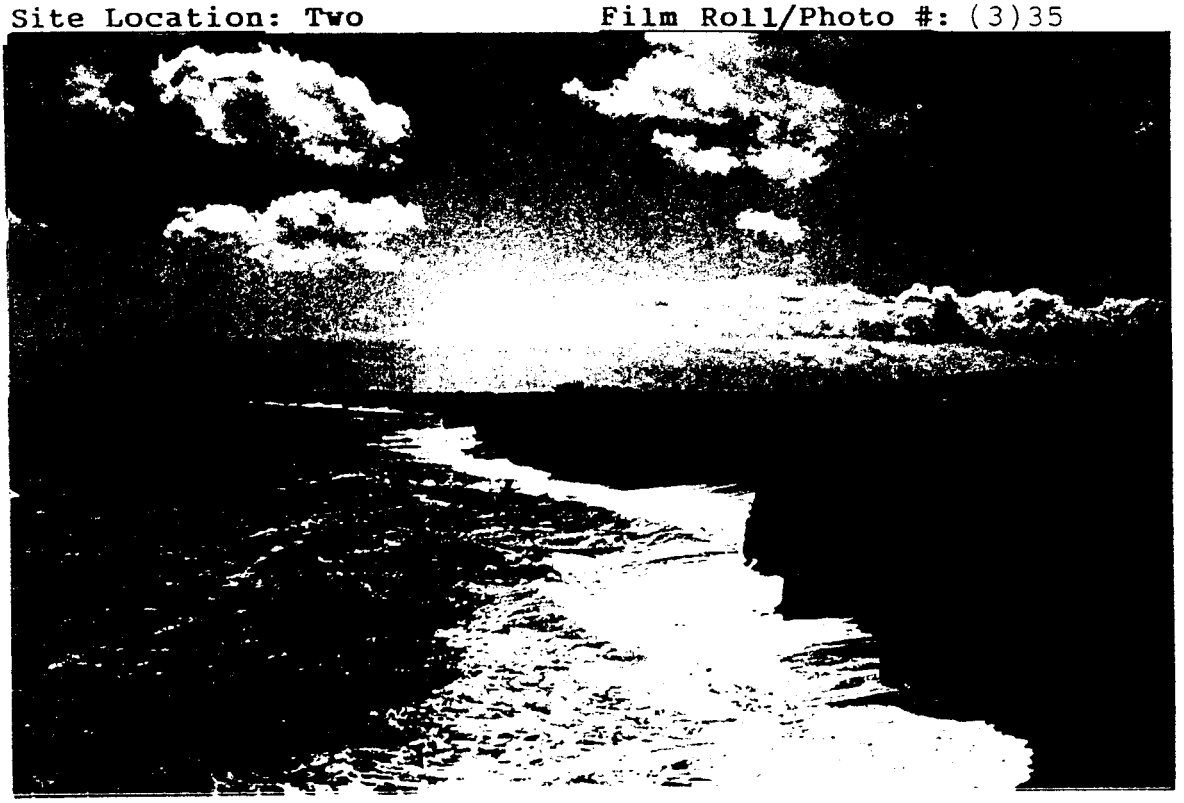


Plate #: 24.

BLACK SAND BEACH PROJECT DATA:

Date: 09/01/95

Project Day: 55.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 8:09 pm and 8:52 am

Heights: 1.0 (h) and 1.9 (h)

Moon: One day before the first quarter moon.

Winds: Light trades blowing on shore.

Observations: This is a scheduled day off, but I hiked out to the a'a flow on the east side of Pulama Pali. It was fairly hugh and at the 500' elevation and heading for the Waha'ula/ Kamoamoa area. The flow was definitely channeling and moving very fast in places and despite what most geologist think, I saw and photographed (video taped) a'a turning into pahoehoe. Later, I came across Dr. Floyd McCoy and his wife at the old Highcastle/Lae 'Apuki area (hugh black sand beach) and informed him of my observation. He confirmed that such an occurance was observed by fellow geologist during the Kupaianaha episodes of 1989-90.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

U.S. Geological Survey (USGS)
Hawaiian Volcano Observatory
09/01/95 - **Volcano Watch**

The long lived eruption on Kilauea's East Rift Zone took a short break starting Tuesday, August 22. Before the pause in activity, we observed that the lava pond inside Pu'u 'O'O Crater was unusually deep (more than 310 feet below the rim). In addition, starting about noon, our instruments began to record changes at Kilauea's summit that included an increase in seismic tremor (ground vibration caused by magma movement) and a delation or downward tilt, of the caldera. We have observed the same pattern before previous pauses in the eruptin, and therefore anticipated the pause in the eruption. At about 10:00 pm, the eruption shut down, as determined from additional changes in seismic activity. The following morning, no lava was entering the ocean at Highcastle, and no active flows could be found on the surface.

By midday on August 23, the summit had begun to reinflate, or tilt upward, and the tremor beneath the summit subsided to background levels. On Friday, August 25, several small swarms of earthquakes occurred beneath the upper East Rift Zone in the vicinity of Pauahi Crater; all the earthquakes were to small to be felt. By 10:00 am; lava was again flowing from a breakout point in the old tube at about the 2200 foot level. This flow was a small, channelized pahoehoe flow that advanced down the eastern side of the Kamoamoa flow field. By Saturday, several additional breakouts had occurred at elevations of about 2150 feet, 2010 feet, and 1700 feet. The lowest breakout was the largest and fed an a'a flow that had advanced to about 700 feet elevation by the end of the day. This flow lobe was igniting fires as it advanced into vegetated areas between the Waha'ula and Kamoamoa flow fields. The eruption restarted slowly and the volume did not reach pre-pause levels until at least Monday. The pond in Pu'u 'O'O apparently rose dramatically during the pause and during the next few days when the eruption was sluggish. Spatter was deposited on the rim of the cone, perhaps when a part of the wall of the crater collapsed into the pond.

By Thursday, August 31, this eastern flow had advanced down to 250 feet and was characterized by open channels from near the breakout point at the top of Pulama Pali. On Friday, the pond in Pu'u 'O'O was below a newly formed crust created when the pond rose during the pause. The active pond was very small and lava streamed from the west to east. The flow near the eastern side of the Kamoamoa flow field had advanced to the 175 foot level, about 3/10 of a mile above Pali Uli. This flow should reach the ocean near Kamoamoa within the next week or so if it continues as the main flow lobe. In the meantime, the VOG (Volcanic smOG) should be less intense since there is no LAZE (LAva haZE) component produced where lava enters the ocean.

The pause in the eruption appear to be caused by a rapid depressurization of the summit magma chamber that occurs when magma intrudes into the upper East Rift Zone. As magma rapidly flows out of the summit reservoir, tremor is produced, and the summit

Volcano Watch: (continued)
deflates (the ground surface drops). These small intrusions do not have enough force to push to the surface and produce an eruption in the upper East Rift Zone. After the intruded magma stagnates within the rift zone, the tremor subsides, and the summit begins to inflate as additional magma from deeper in the system repressurizes the summit magma chamber.

Each of the intrusions that triggers eruptive pauses at Pu'u 'O'O is a potential eruption elsewhere on the volcano. At some future time, a similar, but more forceful, intrusion could lead to the breakout of a new eruptive fissure. The most likely places are where we see such intrusive events again and again. These sights are located near Pauhi Crater and just west of Makaopuhi Crater. Such an event could well signal the end of the Pu'u 'O'O eruption.

Near the end of the long lived (1969-1974) Mauna Ulu eruption, several new fissures formed in the upper East Rift Zone, within Kilauea's summit, and along the Southwest Rift Zone. Activity returned to Mauna Ulu after the outbreaks in the upper East Rift Zone and in the summit. The Southwest Rift Zone eruption was quite voluminous and depressurized the summit magma chamber to such a degree that the pressure had not built up enough to cause a new eruption before the 1975 Kalapana earthquake disrupted the underground magma storage system. Pu'u 'O'O may go through a similar sequence of stops and starts, interrupted by eruptions elsewhere on Kilauea, before activity finally ceases.

Note: The above article was printed in the Hawaii Tribune-Herald newspaper printed on the big island and is included as part of this project data as a reference to the broad spectrum of geological processes which helps to contribute to the formation of black sand beaches.

BLACK SAND BEACH PROJECT DATA:

Date: 09/02/95

Project Day: 56.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	4:11 pm	4:13 pm	n/a	n/a	n/a
Film Roll #: 4.					
Photo(s)#:	5	6	n/a	n/a	n/a

Tides: 10:07 am

Heights: 2.0 (h)

Moon: First quarter moon.

Winds: No data collected.

Observations: The flows continue down Pulama Pali from the 1700' level (top of ridge from our perspective) and is both a'a/pahoehoe.

The fire crew flew over and informed me that the area in which I had hiked yesterday (09/01) had crusted over and that the flow is now more towards the west and above Pali Uli.

I took Floyd and Ann out to the mauka skylight and he agrees with me that it has completely shut down and won't re-juvinate back up again. HVO staff (David Clegg) further agreed with me. Depite such, it was still not and was beginning to collapse in places. Very dangerous at this stage and while I am off duty the interpretation staff/supervisors are bring people out to see it. This practices was immediately stopped upon bringing such to the attention of protection personnel in charge of this "longest emergency in U.S. history", since the eruption started on January 3, 1981.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 09/03/95

Project Day: 57.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 11:12 am

Heights: 2.1 (h)

Moon: One day after the first quarter moon.

Winds: Trades moderate to strong.

Observations: The surface flows are mostly pahoehoe and have isolated itself to the middle to eastern face of Pulama Pali and heading towards the Kamoamoa direction, it still has not hit the ocean.

The Highcastle tube system is completely drained off (finished) and is no longer making any black sand. The surf continues to erode away at the beaches and transfer such down the coast. There was very choppy seas in the afternoon, splashing up onto the sea cliffs over 30' high.

HVO Meeting Notes: n/a

Site Location: One Film Roll/Photo #: (4)5

Site Location: Two Film Roll/Photo #: (4)6

Plate #: 25.

BLACK SAND BEACH PROJECT DATA:

Date: 09/04/95

Project Day: 58.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	5:14 pm	5:16 pm	5:29 pm	5:29 pm	n/a
Photo(s)#:	7	8	9	10	n/a

Film Roll #: 4.

Tides: 12:08 pm

Heights: 2.2 (h)

Moon: Two days after the first quarter moon.

Winds: No data collected.

Observations: The volume appears to be either slowing down or the surface flows are beginning to create another tube system as it heads for the kipuka between Kamoamoa and Waha'ula; I think its more of the later.

The fire crews took another over flight and informed me that it does not look like the flow will hit the ocean by the days end. Hopefully I'll be able to check it out before it does.

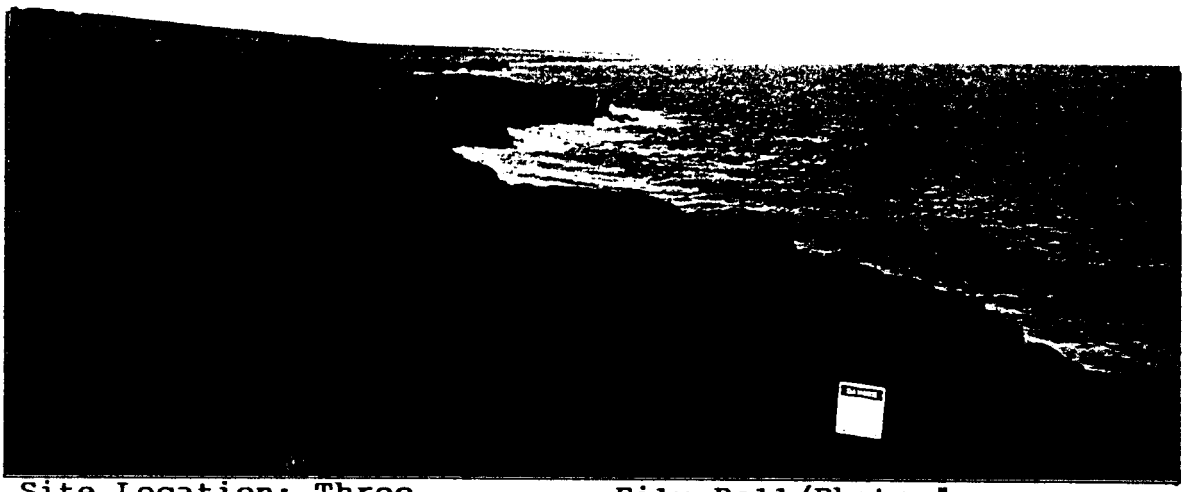
The conditions remain the same at the coast, erosional process in full force.

HVO Meeting Notes: n/a

Site Location: One Film Roll/Photo #: (4)7

Site Location: Two Film Roll/Photo #: (4)8

Plate #: 26.



Site Location: Three Film Roll/Photo #: (4)9

Site Location: Four Film Roll/Photo #: (4)10

Plate #: 27.

BLACK SAND BEACH PROJECT DATA:

Date: 09/05/95

Project Day: 59.

Site Location(s):	One	Two	Three	Four	Five
Time:	n/a	n/a	n/a	n/a	n/a
Film Roll #: n/a					
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Tides: 12:56 pm

Heights: 2.3 (h)

Moon: Three days after the first quarter moon.

Winds: Light trades blowing off shore.

Observations: Red lava visible on Pulama Pali during the day and excellent show of massive breakouts at dusk. It still has not hit the ocean yet.

HVO Meeting Notes:

Geology: Little change over the last week. Flows on the upper reaches continue above and part way down Pulama Pali. The easternmost flow from the 1400' level on Pulama Pali has reached the foot of the pali (Pali Uli) and is ponding on the flats. It has been the source of much burning and methane explosions in the kipuka between the Kamoamoa and Waha'ula fields. As of Monday (4th) it was about 100 yards mauka of the short strip of the Chain of Craters road. It is expected to reach the ocean today, if it hasn't already.

The Pu'u 'O'O pond, which rose significantly during the pause of two weeks ago, has continued at a level higher than usual. On Friday (1st) it stood at 67 M(220') below the spillway as compared to a more normal 80-90 M(220-260') below. The pond was mostly crusted and sluggish.

HVO Meeting Notes: (continued)
Seismology: Earthquake counts are back down to nomal low levels after the flurries related to the recent pause.

BLACK SAND BEACH PROJECT DATA:

Date: 09/06/95

Project Day: 60.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	3:51 pm	3:53 pm	n/a	n/a	n/a
Film Roll #: 4.					
Photo(s)#:	13	14	n/a	n/a	n/a

Tides: 1:39 pm

Heights: 2.2 (h)

Moon: Four days after the first quarter moon.

Winds: Light trades blowing off shore.

Observations: The flow hit the previously isolated section of the Chain of Craters Road between Kamoamoa and Waha'ula at about 3:55 pm (black smoke from the road burning) and should reach the ocean by late tonight or early tomorrow (09/07) morning; I say the later.

No change in the coastal conditions.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 09/07/95

Project Day: 61.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 2:18 pm

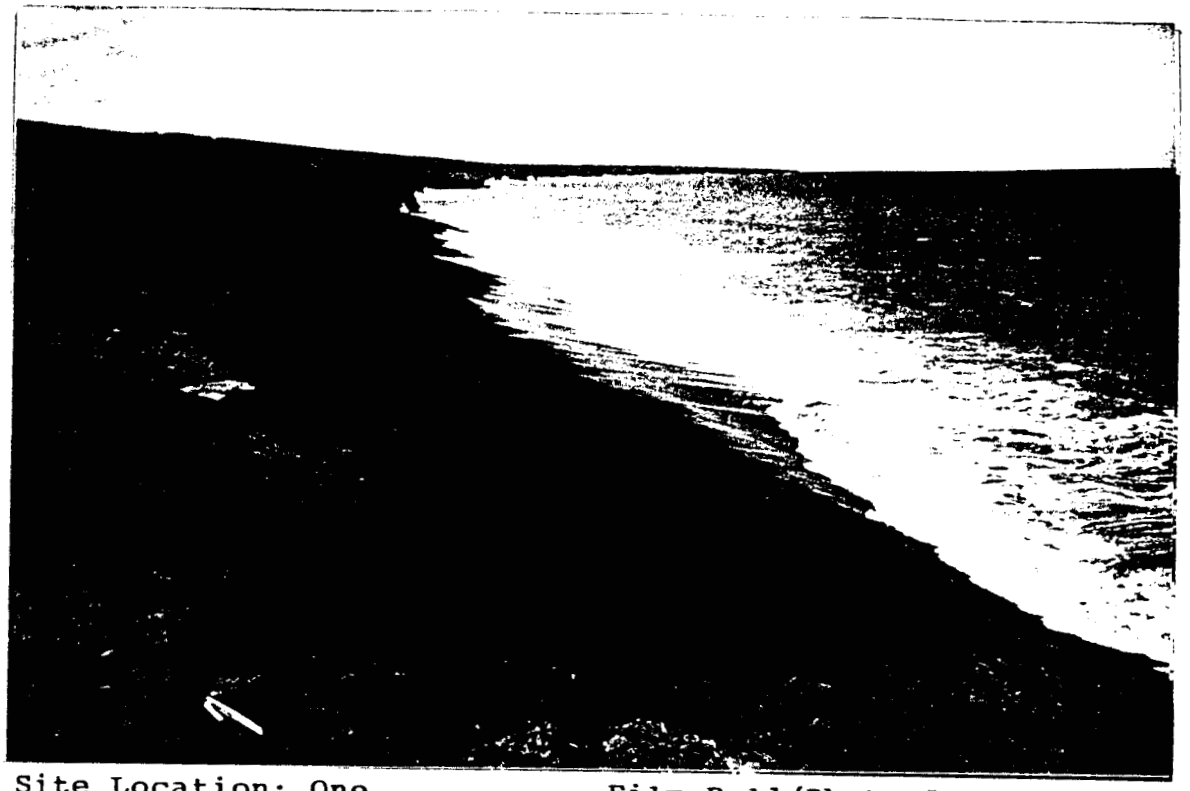
Heights: 2.2 (h)

Moon: One day before the full moon.

Winds: No data collected.

Observations: No data collected due to scheduled day off.

HVO Meeting Notes: n/a



Site Location: One Film Roll/Photo #: (4)13

Site Location: Two Film Roll/Photo #: (4)14

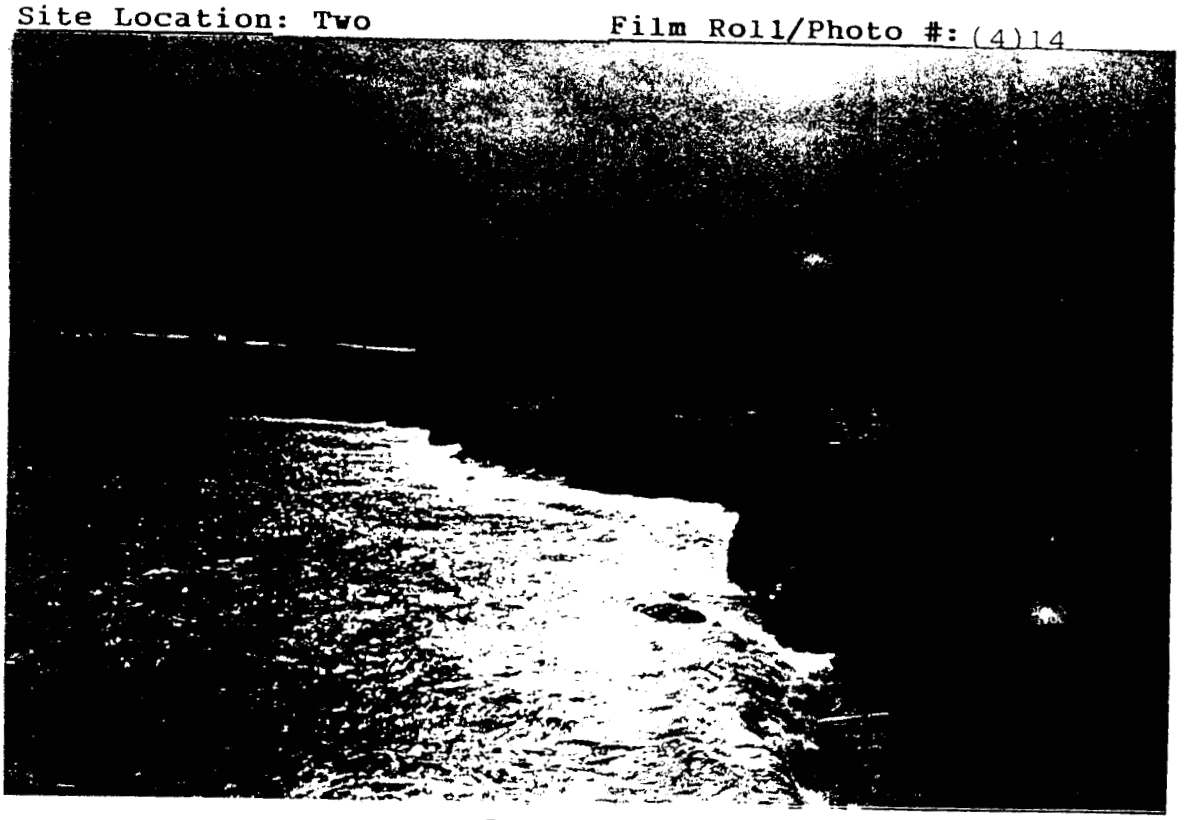


Plate #: 28.

BLACK SAND BEACH PROJECT DA

Date: 09/08/95

Project Day: 62.

Site Location(s):	**One**	**Two**	**Three**	**Four**	
Time:	n/a	n/a	n/a	n/a	n/a
Film Roll #: n/a					
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Tides: 2:55 pm

Heights: 2.0 (h)

Moon: Full moon.

Winds: Light trades blowing along shore.

Observations: Regular scheduled day off, but my friend Kaohu Sproat whom owns Imu Air Service, took me up on his helicopter from Waimea to Volcanoes, then back via refueling stop in Hilo and over the Hamakua Coast. The weather was misty rain as we flew over the forests to view Pu'u 'O'O vent, it was awesome for it was my first time seeing such this close and from the air. Despite the sulfer dioxide plume rising out of it, we were able to see a little red lava ponding inside. There are lots of exposed tube systems both old and new and the skylights exhibited movement inside. We followed the path to the coastline by Kamoamoa and observed the road still burning and a small finger of lava had just hit the water (11:00 am). According to HVNP staff, a steam plume was not visible from their perspective at Panau Nui/Lae 'Apuki (end of the road) until they had arrived the following (09/09) day at around 12:30 pm. It is possible that it could have been viewed from that point earlier, but no personnel was there to witness it.

HVO Meeting Notes: n/a

Observations: (continued)

The last time staff was down at the coast was up to 7:00 pm this evening; so the ocean entry as seen from the end of the road had occured in between then and their arrival the following day. The actual time being 11:00 am as witnessed from the air. The lava was observed flowing off of the old sea cliff, onto the bench created in 1989-90 episodes. Be advised that no black sand was observed in this area from previous flows.

Note: This flight was captured on video, but the lighting was a little washed out due to not having proper filters.

BLACK SAND BEACH PROJECT DATA:

Date: 09/09/95

Project Day: 63.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 3:30 pm

Heights: 1.9 (h)

Moon: One day after the full moon.

Winds: No data collected.

Observations: No data collected due to taking off.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 10/10/95

Project Day: 64.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	3:42 pm	3:45 pm	n/a	n/a	n/a
Film Roll #: 4					
Photo(s)#:	15	16	n/a	n/a	n/a

Tides: 4:05 pm

Heights: 1.7 (h)

Moon: Two days after the full moon.

Winds: Trades blowing on shore.

Observations: Observed the steam plume at Kamoamoa/Waha'ula as we drove down the coast to the eruption site. Upon arrival another HVNP Ranger informed me, that the plume is twice its size from yesterday (10/09). This new ocean entry is definitely producing more black sand for one can clearly see a distinct lighter color path moving westward from its source and it has reached down to the old Highcastle (Panau Nui/Lae 'Apuki) area. I have this on video as taken from the Ke Ala Komo lookout on the Chain of Craters Road at approximately 1800' elevation.

The beach continues to erode away, despite the new influx of black sand moving down the coast. The new ocean entry is about two miles away or more.

HVO Meeting Notes: n/a

Site Location: One Film Roll/Photo #: (4)15

Site Location: Two Film Roll/Photo #: (4)16

Plate #: 29.

BLACK SAND BEACH PROJECT DATA:

Date: 09/11/95

Project Day: 65.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	4:49 pm	4:49 pm	4:41 pm
Film Roll #:	4.				
Photo(s)#:	n/a	n/a	18	19	17

Tides: 4:39 pm

Heights: 1.5 (h)

Moon: Three days after the full moon.

Winds: Light trades 10 mph on shore most of the day, switching to kona around the time of taking the photographs.

Observations: A double plume was observed on the drive down in the new location (Kamoamoa/Waha'ula). The pahoehoe flow up on Pulama Pali is crusting over, not much red is visible.

The distinct black sand zone has now made its way to the Panau Nui/Lae 'Apuki ("Makai Trail") area and it converged with a surface current moving in the opposite direction and also carrying a smaller layer of black sand (refer to the illustration below).

There was an excellent view of Pu'u 'O'O glowing in the distance from the Hawaiian Acres sub-division in Mt. View; the sky being very clear and with little or no winds.

HVO Meeting Notes:

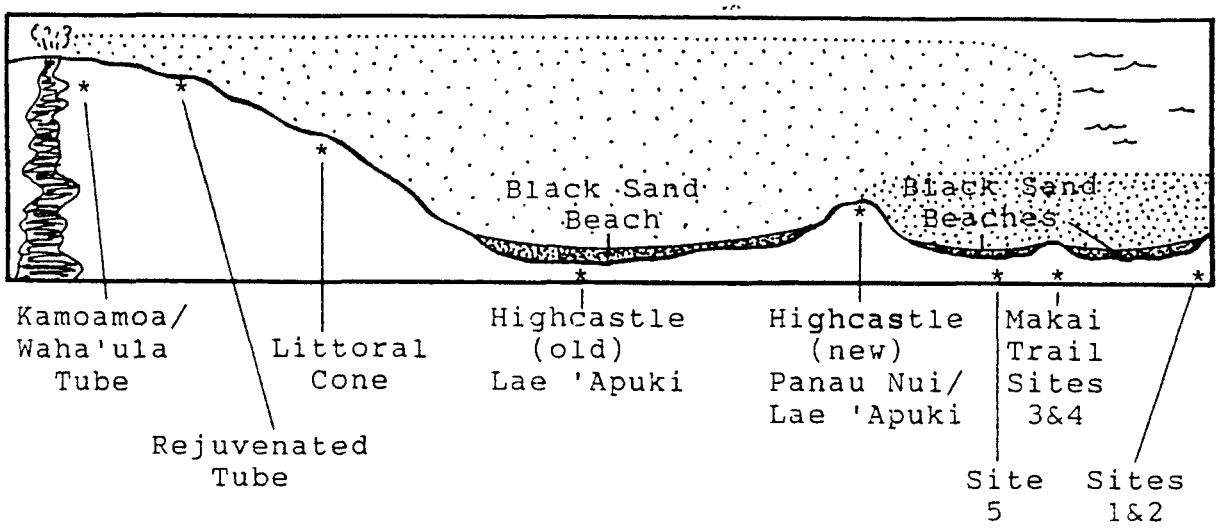
Geology: Breakouts continue on the two flows originating after the most recent pause from the 2200' level above Pulama Pali and from the 1400' level on the pali. On Saturday (09/09) and again this morning 'a'a breakouts were seen at the 900' level on the latter flow. This same flow, moving in the kipuka between the Kamoamoa and the Waha'ula flow fields, breaks into two lobes at about the 200' level. The lobes have moved parallel to each other, crossing the short section of the Chain of Craters Road remaining in the kipuka, and have each entered the ocean--the easternmost on Thursday (09/07) evening, and the western on Saturday (09/09). The entries are diffuse, building a new bench about 30-50 M (roughly 100-165' wide).

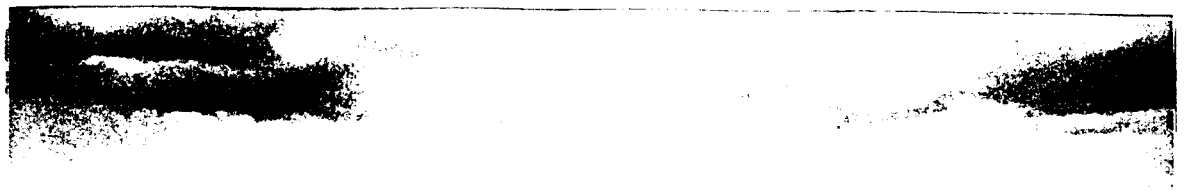
HVO Meeting Notes: (continued)

The pond at Pu'u 'O'O has continued to fluctuate following the pause, as it was during other pauses. It remained high on August 25, was low on the 29th, high again on September 5, and low on the 8th. The action does not follow any previous pattern.

Gas: The Tube Tattler at the upper breakout at 2200' has been relocated to a new skylight. Temperatures above the lava were recently recorded at 1106 and 1070°C (2023 and 1958°F).

Observations: (continued)





Site Location: Three Film Roll/Photo #: (4)18

Site Location: Four Film Roll/Photo #: (4)19

Plate #: 30.

Site Location: Five **Film Roll/Photo #**: (4)17

Plate #: 31.

BLACK SAND BEACH PROJECT DATA:

Date: 09/12/95

Project Day: 66.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	1:50 pm	1:52 pm	n/a	n/a	n/a
Film Roll #: 4.					
Photo(s)#:	20	21	n/a	n/a	n/a

Tides: 5:14 pm

Heights: 1.1 (h)

Moon: Four days after the full moon.

Winds: Kona winds, the vog (volcanic smog) is very bad up in the Volcanoes community and down into Glennwood as well.

Observations: The plume is very thick and according to the fire crew and HVO personnel out in the field, there is several entry points 30-50 meters wide and pouring into the ocean from the surface flow out at Kamoamoa/Waha'ula.

The sand belt from that area is not as wide today and fairly stationary up to the Panau Nui tube system (Highcastle). There were no visible currents converging into this black sand belt.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 09/12/95

Project Day: 66.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	1:50 pm	1:52 pm	n/a	n/a	n/a
Film Roll #:	4.				
Photo(s)#:	20	21	n/a	n/a	n/a

Tides: 5:14 pm

Heights: 1.1 (h)

Moon: Four days after the full moon.

Winds: Kona winds, the vog (volcanic smog) is very bad up in the Volcanoes community and down into Glennwood as well.

Observations: The plume is very thick and according to the fire crew and HVO personnel out in the field, there is several entry points 30-50 meters wide and pouring into the ocean from the surface flow out at Kamoamoa/Waha'ula.

The sand belt from that area is not as wide today and fairly stationary up to the Panau Nui tube system (Highcastle). There were no visible currents converging into this black sand belt.

HVO Meeting Notes: n/a

Site Location: One Film Roll/Photo #: (4)20

Site Location: Two Film Roll/Photo #: (4)21

Plate #: 32.

Site Location: Five **Film Roll/Photo #**: (4)22

Plate #: 33.

BLACK SAND BEACH PROJECT DATA:

Date: 09/13/95

Project Day: 67.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	1:50 pm
Film Roll #: 4.					
Photo(s)#:	n/a	n/a	n/a	n/a	22

Tides: 5:52 pm

Heights: 1.1 (h)

Moon: Five days after the full moon.

Winds: No data collected.

Observations: Had a report of two hugh pahoehoe flows at 10:00 pm and 11:00 pm last night (09/12) on Pulama Pali and five fingers of massive flows going into the ocean at Kamoamoa/Waha'ula. Upon our departure of the end of the road (just past the 20 mile marker) by 7:00 pm, no red lava was observed all day and there was a heavy overcast.

The beach continues to erode and shift down the coastline.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 09/14/95

Project Day: 68.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 6:42 pm

Heights: 1.1 (h)

Moon: Two days before the last quarter moon.

Winds: Kona conditions, still lots of vog.

Observations: Scheduled day off, but per HVNP eruption crew there was good viewing of red lava up on Pulama Pali and a good size plume at the new ocean entry (Kamoamoa/Waha'ula).

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 09/15/95

Project Day: 69.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 8:02 pm

Heights: 0.9 (h)

Moon: One day before the last quarter moon.

Winds: No data collected.

Observations: Scheduled day off, but per HVNP eruption crew there was a massive pahoehoe outbreak at about the 1700' level at 7:00 pm and a red trail extended all the way to the ocean entry. This indicates high volume of surface lava is coming out of Pu'u 'O'O.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 09/16/95

Project Day: 70.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	3:00 pm	3:03 pm	n/a	n/a	n/a
Film Roll #:	4.				
Photo(s)#:	23	24	n/a	n/a	n/a

Tides: 9:48 pm

Heights: 0.9 (h)

Moon: The last quarter moon.

Winds: Trades blowing light at 5-10 mph along shore.

Observations: No red lava visible all day from our perspective, but fire crews flew over the flow at 3:00 pm and indicated that it is about a quarter mile wide and more towards the Kamoamoa side of the flow field. The plume continues to be very strong, high output - thus more black sand is created.

The beach continues to erode despite the light band of sand being carried down from the eruption activity site (now considere to be over 3 miles away).

HVO Meeting Notes: n/a

Site Location: One Film Roll/Photo #: (4)23

Site Location: Two Film Roll/Photo #: (4)24

Plate #: 34.

BLACK SAND BEACH PROJECT DATA:

Date: 09/17/95

Project Day: 71.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 10:40 am and 11:07 pm

Heights: 1.8 (h) and 0.9 (h)

Moon: One day after the quarter moon.

Winds: No data collected.

Observations: Only able to see the active flows during the evening up on Pulama Pali and as it makes its way to the ocean entry at Kamoamoa/Waha'ula. The fire crews did another over-flight of the area and indicates that the flow is now more westerly (South Point side) and is still about a quarter of a mile wide. I also spoke to USGS staff out in the field and they confirm that the volume of lava remains at about 500,000 cubic meter per day. Also got mixed information from them concerning the old Panau Nui/Lae 'Apuki tube system, some say that it could become active again. It still continues to glow red from the heat.

The black sand silt band off shore is approximately 70-100 yards off of the "Makai Trail", it seems to have origionate from the Panau Nui/Lae 'Apuki tube system (large deposits underneath?) and it converges with the larger black sand silt line off the coast by the Kamoamoa/Waha'ula eruption site (active eruption There is a distinct border were they meet, possible halocline and thermocline exists there (I think so).

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 09/18/95

Project Day: 72.

Site Location(s):	One	Two	Three	Four	Five
Time:	2:41 pm	3:01 pm	3:17 pm	3:17 pm	3:19 pm
Film Roll #:	4	5 (start)			
Photo(s)#:	25	1	2	3	4

Tides: 11:32 am

Heights: 1.9 (h)

Moon: Two days after the quarter moon.

Winds: Light trades blowing off shore.

Observations: The black sand silt line from the eruption site is fairly stationary outside of the old Panau Nui/Lae 'Apuki tube system. Patches of it is widely dispersed down the coastline all the way to Apua Point (refer to the map).

Erosion continues along the "Makai Trail" area and is still shifting down the coast.

HVO Meeting Notes:

Geology: Surface flows continued to expand through the week on the east side of the flow, that included burning in the kipuka between the Kamoamoa and Waha'ula fields. There were spectacular sheets streaming down Pulama Pali on Tuesday (09/11) night. Flows were also visible on Saturday (09/16) night, and glow on Sunday (09/17) night. The two lobes that had formed just inland of the coast on the westernmost flow have now almost completely coalesced. There is a small kipuka still at the remaining segment of the Chain of Craters Road. Earlier in the week there was a wide western-moving lobe just inland of the former campground at Kamoamoa. As of 1:00 pm Sunday (09/17) that movement had ceased, The entry area is broad with the greater volume on the western side.

HVO Meeting Notes: (continued)

The Pu'u 'O'O pond fluctuation reported last week has continued. Net fluctuation has been about 40 M (130+feet), the lowest point being about 100 M (328') below the spillway.

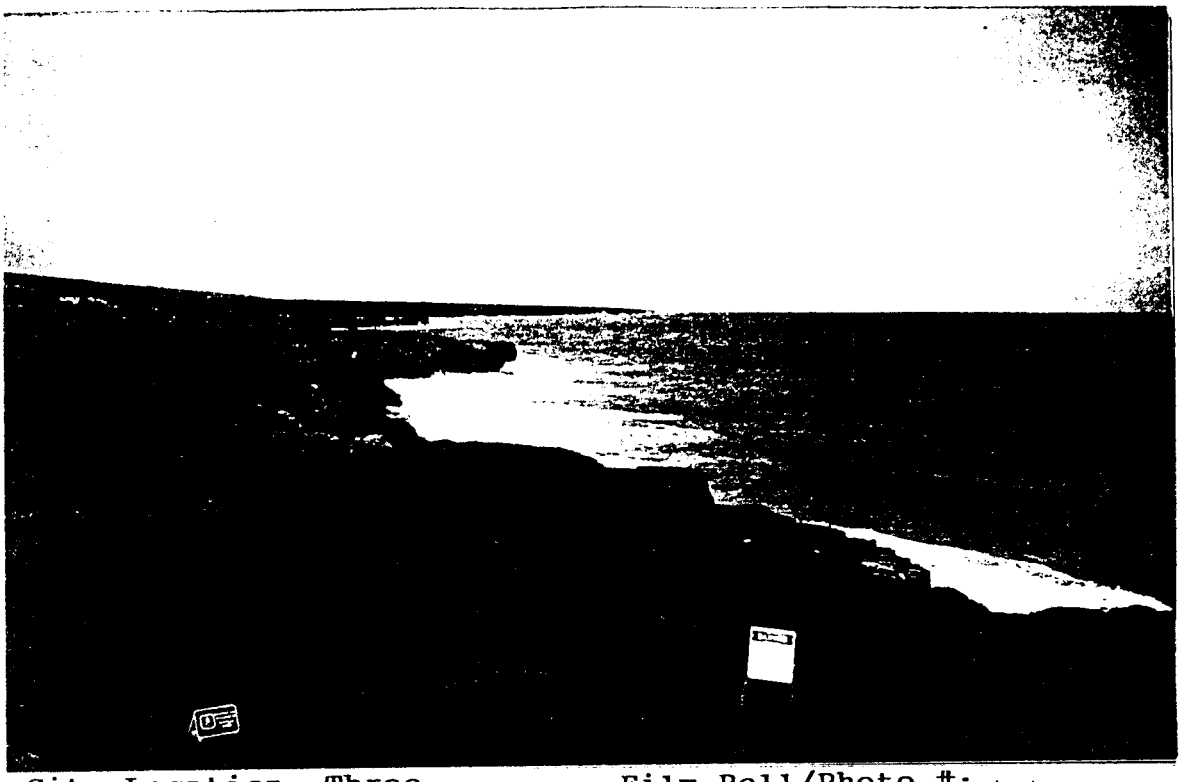
Geophysics: Flux (flow volume) is currently being monitored at four skylights. Volumes at upper levels have been steady, while lower levels show a slight drop, indicating breakouts above the lower skylights. Small tubes are beginning to form in the broad sheet at the current entry area.

Deformation: GPS monitoring of movement, relative to a fixed point on Kaua'i, between two points, one at HVO and the other on the Hilina Pali Road, on a line across the caldera, showed an interesting expansion just before the last pause. The maximun net movement between the two points was one centimeter. The data becomes part of the information about the relationship between summit conditions and pauses at Pu'u 'O'O, and may help in predicting future pauses.

Site Location: One Film Roll/Photo #: (4)25

Site Location: Two Film Roll/Photo #: (5)1

Plate #: 35.



Site Location: Three Film Roll/Photo #: (5)2

Site Location: Four Film Roll/Photo #: (5)3

Plate #: 36.

Site Location: Five
Film Roll/Photo #: (5)4

Plate #: 37.

BLACK SAND BEACH PROJECT DATA:

Date: 09/19/95

Project Day: 73.

Site Location(s):	One	Two	Three	Four	Five
Time:	n/a	n/a	n/a	n/a	n/a
Film Roll #: n/a					
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Tides: 12:15 pm

Heights: 1.9 (h)

Moon: Three days after the quarter moon.

Winds: Trades blowing 15 mph off shore.

Observations: No red lava viewing until dark on top of Pulama Pali at the 1700' level and the glow extends all the way to the coastline of Kamoamoa/Waha'ula (tube system developed yet?, probably not). The plume also glowed and was fairly big (high volume); alternating between light and dark color. This is definite pyroclastic explosions and making more black sand.

As for the project sites (three, four, five) continues to erode away and help to build up the beach area depicted in sites one and two.

The black sand silt line is starting to disperse due to the currents and semi-choppy seas; its not as evident.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 09/20/95

Project Day: 74.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	4:00 pm	4:02 pm	n/a	n/a	4:31 pm
Film Roll #:	5.				
Photo(s)#:	5	6	n/a	n/a	n/a

Tides: 12:51 pm

Heights: 1.9 (h)

Moon: Four days after the quarter moon.

Winds: Trades blowing 20-30 mph on shore.

Observations: No red lava visible until dusk on top of Pulama Pali and the glow at the plume.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 09/21/95

Project Day: 75.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 1:25 pm

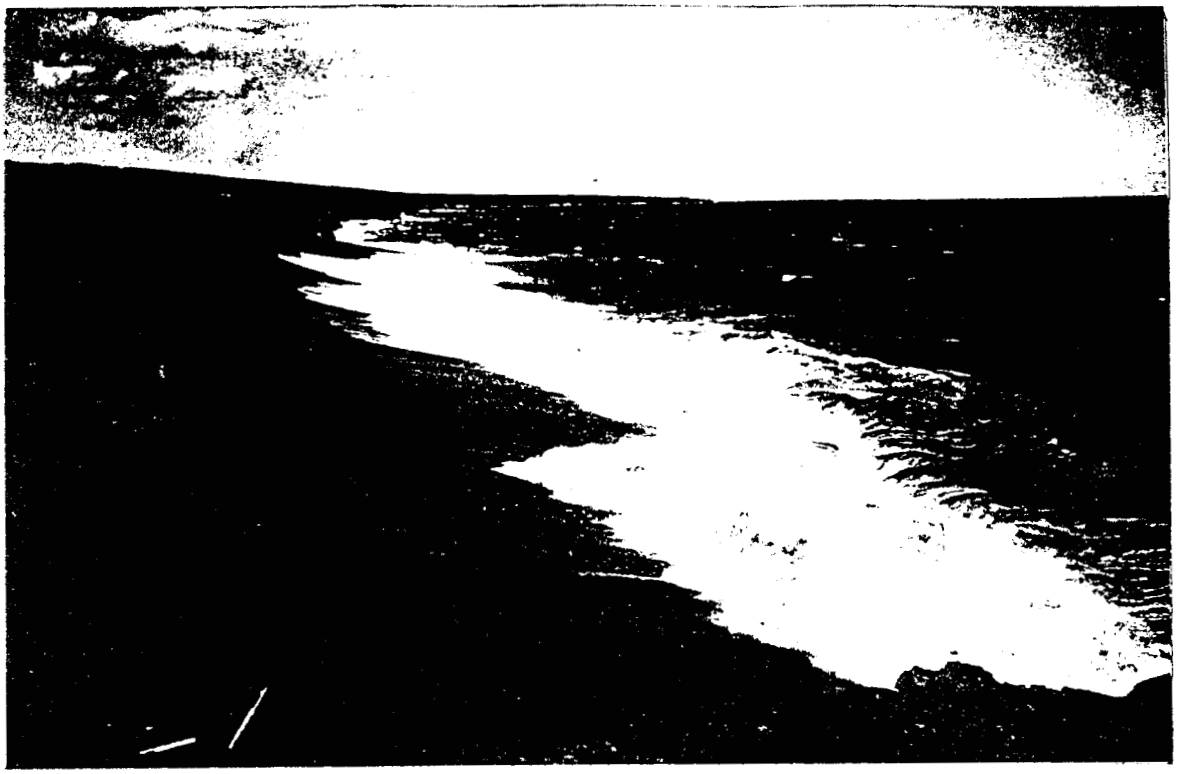
Heights: 1.9 (h)

Moon: Five days after the quarter moon.

Winds: No data collected.

Observations: No data collected due to scheduled day off.

HVO Meeting Notes: n/a



Site Location: One Film Roll/Photo #: (5)5

Site Location: Two Film Roll/Photo #: (5)6

Plate #: 38.

BLACK SAND BEACH PROJECT DATA:

Date: 09/22/95

Project Day: 76.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 1:57 pm

Heights: 1.9 (h)

Moon: Two days before the new moon.

Winds: No data collected.

Observations: No data collected due to scheduled day off.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 09/23/95

Project Day: 77.

Site Location(s):	One	Two	Three	Four	Five
Time:	3:58 pm	4:01 pm	n/a	n/a	n/a
Photo(s)#:	8	9	n/a	n/a	n/a

Film Roll #: 5.

Tides: 3:00 pm

Heights: 1.8 (h)

Moon: One day before the new moon; also its the Autumnal Equinox.

Winds: No data collected.

Observations: A second steam plume on the Lae 'Apuki side of the current flow can be observed from our perspective from the end of the road. According to HVNP staff, it hit the ocean two days ago (09/21) at about 5:00 pm. This will help to add more black sand to the old Highcastle beach (Floyd McCoy's project sites) and down the coastline. I will have to hike out to investigate for it looks like its in the same area of a breakout of last July/August 1994.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 09/24/95

Project Day: 78.

Site Location(s):	One	Two	Three	Four	Five
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 3:03 pm

Heights: 1.7 (h)

Moon: New moon.

Winds: Trades blowing 20 mph on shore.

Observations: Very little evidence of the black sand line off shore, due to the currents and winds dispersing such in the surf.

I hiked out to the new plume and to my surprise I encountered not a surface flow, but a rejuvenated tube system about 25-30 feet below the cliff face and pouring lava into the water. It is in the same area (tube system) of last year as mentioned in my 09/23 report. It was extremely nerve wracking to go across the tube system as it cracked and slumped, while mini-explosions took place inside. I checked all over the place to look for a surface flow which maybe feeding into this old tube system and found none.

The main plume (Kamoamoa/Waha'ula) is about three fourths of a mile away, but I was unable to investigate it for I was out in the field to long.

Hiked back along the old Highcastle area and investigated the makai skylight of Panau Nui/Lae 'Apuki; its still very hot.

Note: I video taped the ocean entry.

HVO Meeting Notes:

Geology: The entry is strong at the eastern edge of the field. A new entry occured at about 5:30 pm on Thursday (09/21), makai of the former Kamoamoa. Mid-week a narrow sheet flowed south from a westerly lobe of the current flow to form the new entry. The flow itself has been widening both to the east and to the west between Pali Uli and about the 400' level. Burning has been prevalent on the west in the kipuka between the Kamoamoa and Waha'ula fields. Several new breakouts have occured high on the slopes above Pali Uli between the 2020 and 2450' skylights. The old main tube, high on the western edge of the field, has split above the 2250' level, and formed an easterly segment that has been the source of breakouts.

Site Location: One Film Roll/Photo #: (5)8

Site Location: Two Film Roll/Photo #: (5)9

Plate #: 39.

HVO Meeting Notes: (continued)

In the past nine months the number of breakouts has shown a steady increase, indicating the fragile nature of the old tube system. Lava volume has held steady.

During the week the Pu'u 'O'O pond dropped again to about 95 M (313') below the spillway. The pond measured about 15 M (49') across, and was quite active.

BLACK SAND BEACH PROJECT DATA:

Date: 09/25/95

Project Day: 79.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	3:21 pm	3:23 pm	5:55 pm	5:55 pm	5:50 pm
Photo(s)#:	10	11	13	14	12

Film Roll #: 5.

Tides: 3:38 pm

Heights: 1.6 (h)

Moon: One day after the new moon.

Winds: No data collected.

Observations: Did some video taping of sites three, four and five; it should definitely show the erosion in the area as well as the second plume. It showed about five different areas in the evening where lava was pouring out into the water; whereas there is less red showing up on Pulama Pali (it must be tubing).

The main plume at Kamoamoa/Waha'ula is still very large and indicating a high volume of lava producing more black sand.

HVO Meeting Notes: n/a

Site Location: One Film Roll/Photo #: (5)10

Site Location: Two Film Roll/Photo #: (5)11

Plate #: 40.

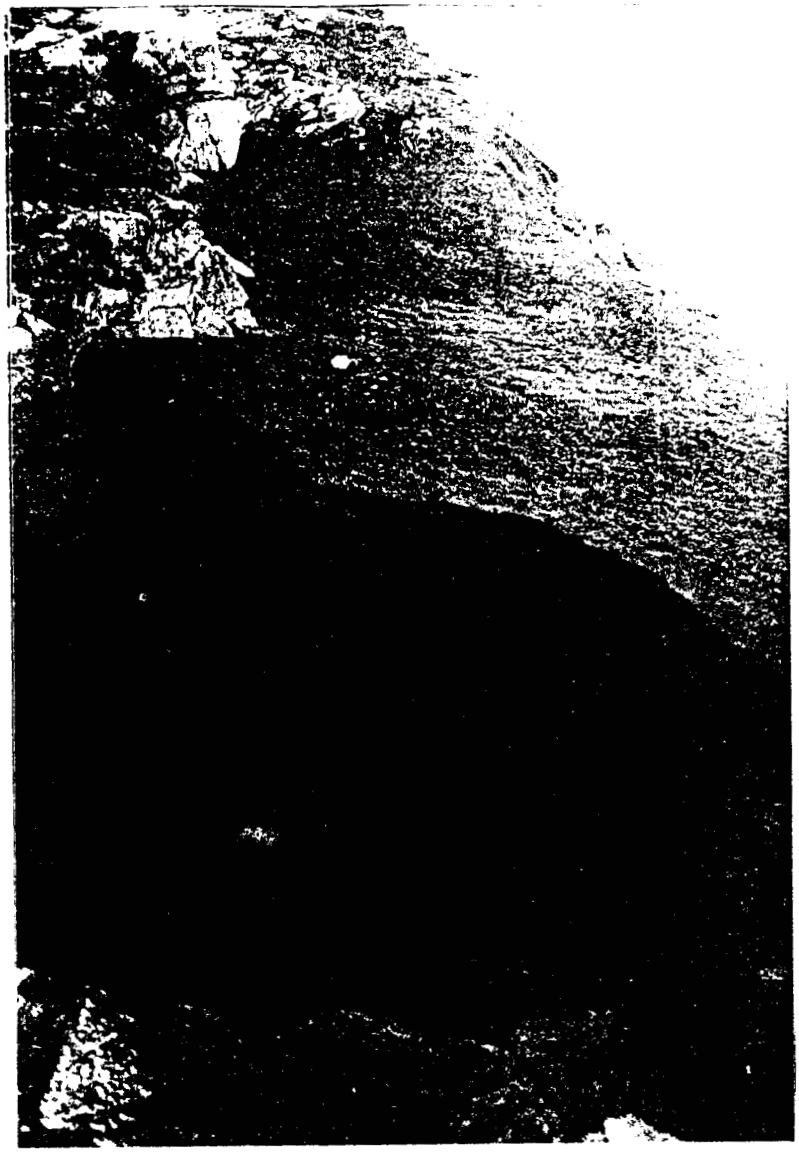
Site Location: Three

Film Roll/Photo #: (5)13

Site Location: Four

Film Roll/Photo #: (5)14

Plate #: 41.



Site Location: Five
Film Roll/Photo #: (5)12

Plate #: 42.

BLACK SAND BEACH PROJECT DATA:

Date: 09/26/95

Project Day: 80.

Site Location(s):	One	Two	Three	Four	Five
Time:	n/a	n/a	n/a	n/a	n/a
Film Roll #:	n/a				
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Tides: 4:16 pm

Heights: 1.4 (h)

Moon: Two days after the new moon.

Winds: Trades moderate to strong and blowing off shore.

Observations: The surface flows up on Pulama Pali becomes increasingly difficult to see during the evening with only seven spots of red sighted along the tube path. The plume remains very strong in output, whereas the second plume (Lae 'Apuki side) has slowed down to 2-3 fingers of lava going into the ocean.

The black sand silt line is no longer defined, the high surf has scattered it about. The beach continues to erode at the "Makai Trail" and move westerly (South Point side).

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 09/27/95

Project Day: 81.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	2:10 pm	2:12 pm	n/a	n/a	n/a
Photo(s)#:	15	16	n/a	n/a	n/a

Film Roll #: 5.

Tides: 4:59 pm

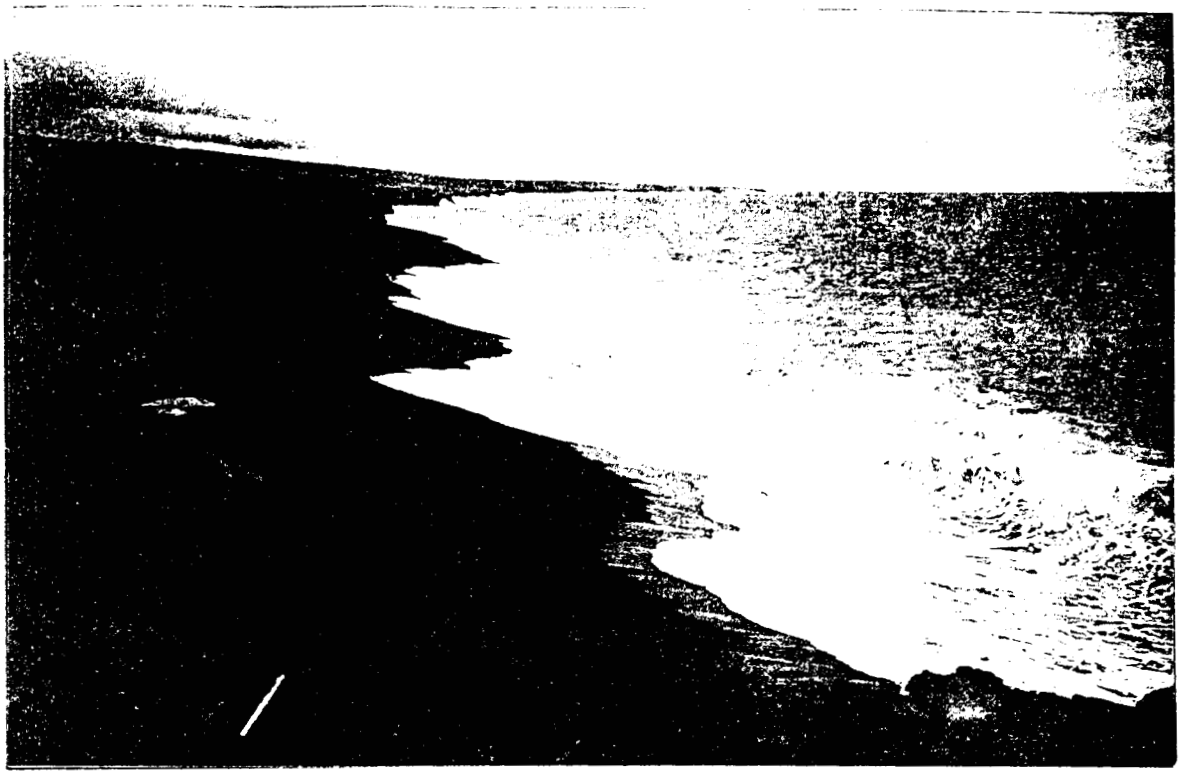
Heights: 1.2 (h)

Moon: Three days after the new moon.

Winds: Moderate trades blowing both on and off shore.

Observations: It rained on and off most of the day, no red lava observed at all.

HVO Meeting Notes: n/a



Site Location: One Film Roll/Photo #: (5)15

Site Location: Two Film Roll/Photo #: (5)16

Plate #: 43.

BLACK SAND BEACH PROJECT DATA:

Date: 09/28/95

Project Day: 82.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 5:49 pm

Heights: 1.1 (h)

Moon: Four days after the new moon.

Winds: No data collected.

Observations: No data collected due to scheduled day off.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 09/29/95

Project Day: 83.

Site Location(s):	One	Two	Three	Four	Five
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 7:00 pm

Heights: 0.9 (h)

Moon: Two days before the first quarter moon.

Winds: No data collected.

Observations: No data collected due to scheduled day off.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 09/30/95

Project Day: 84.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	3:51 pm	3:54 pm	n/a	n/a	n/a
Film Roll #: 5					
Photo(s)#:	17	18	n/a	n/a	n/a

Tides: 8:41 pm

Heights: 0.9 (h)

Moon: One day before the first quarter moon.

Winds: Trades blowing 18-20 mph on shore.

Observations: Per HVNP eruption staff, there was no change in activity the last two days. There is still the two plumes and very little red showing up on Pulama Pali, but at 6:12 pm there must have been a massive bench collapse at the Kamoamoa/Waha'ula plume for it created a giant mushroom shaped cloud. As a result boulder size material was thrown into the air from the resulting collapse and pyroclastics that followed.

HVO Meeting Notes: n/a

Site Location: One Film Roll/Photo #: (5)17

Site Location: Two Film Roll/Photo #: (5)18

Plate #: 44.

BLACK SAND BEACH PROJECT DATA:

Date: 10/01/95

Project Day: 85.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 10:22 pm and 9:33 am

Heights: 0.9 (h) and 2.1 (h)

Moon: The first quarter moon.

Winds: Trades blowing 15-20 mph off shore.

Observations: Conditions remain the same, less red lava viewing up on Pulama Pali and at the flume.
The beaches continue to erode and shift.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 10/02/95

Project Day: 86.

Site Location(s):	One	Two	Three	Four	Five
Time:	2:09 pm	2:11 pm	2:29 pm	2:29 pm	2:33 pm
Film Roll #: 5.					
Photo(s)#:	19	20	21	22	23

Tides: 10:40 am

Heights: 2.1 (h)

Moon: One day after the first quarter moon.

Winds: Small crafts warnings issued, winds blowing strong on shore - choppy seas.

Observations: No change in conditions, less red lava viewing and more black sand beach erosion/transport to other locations.

HVO Meeting Notes:

Geology: Two new entries developed over the weekend from a wide spur fed by the flow on the east side of the field from above Pali Uli and moving between Lae 'Apuki and Pu'u Manawalea. The entries are on either edge of the spur at the coast. Park Rangers at the coast noted a large explosion cloud at the eastern entry shortly after 6:00 pm on Saturday (09/30) which indicated a bench collapse. HVO personnel had earlier noted cracks in the bench just west of the entry area and surmise that the collapse was there (**no way**). Blue glassy breakouts were noted at the Kamokuna (east) entry. The Kamoamoa entry is waning.

Conditions in the Pu'u 'O'O crater were difficult to observe because of heavy fuming, but a new glow was noted in the vent 51 pit at the west base of the cone.

HVO Meeting Notes: (continued)
Geophysics: A series of photographs taken between August 5 and 22 of the 2450' skylight, shows a significant drop in the floor of the tube, due to thermal and mechanical erosion by the lava.

Deformation: The summit has been showing slight, slow inflation.

Notes of Interest: Olivine that crystalizes in the magma chamber (**Bones reaction series**) of Kilauea settles to the base of the chamber to form tightly packed cumulates. These crystalline masses, retaining temperatures of 1100°C (2000°F) or more, are capable of flowing, much like glacial ice, into the area below and seaward of the magma chamber and partially into the rift zones, where they exert a continuous horizontal pressure against the unstable flank. *This pressure enhances* gravitational failure and dike intrusion, and may be the major driving force of large landslides such as formed the Hilina and Holei pali.

Note: The enhanced (**bold**) imput is of my doing. On the front gives reference to HVO personnel indicating that the bench had already collapsed. No disrespect intended to HVO, but the personnel in which they gave reference to was volunteers visiting from the mainland and had given us (HVNP) wrong information on other occasions after coming out of the field. Upon further investigation by myself or other HVNP staff, we would confirm the information to be in error. Please be advised that eruption duty staff, such as myself are on the coast daily to witness any chang and it is us who usually notify HVO of such occurances. Such a bad call shall occur once more in this project to which I am very certain of the observation.

Site Location: One Film Roll/Photo #: (5)19

Site Location: Two Film Roll/Photo #: (5)20

Plate #: 45.

Site Location: Three Film Roll/Photo #: (5)21

Site Location: Four Film Roll/Photo #: (5)22

Plate #: 46.

Site Location: Five
Film Roll/Photo #: (5)23

Plate #: 47.

BLACK SAND BEACH PROJECT DATA:

Date: 10/03/95

Project Day: 87.

Site Location(s):	One	Two	Three	Four	Five
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 11:37 am

Heights: 2.0 (h)

Moon: Two days after the first quarter moon.

Winds: Small craft warnings still posted, winds blowing off shore.

Observations: The second plume (reactivated tube system) has moved its flows on a small bench it created more towards the eastern (Kalapana) side. There is less visibility of red as a result of its movement and there is only two small spots of red visible up on Pulama Pali during the evening.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 10/04/95

Project Day: 88.

Site Location(s):	One	Two	Three	Four	Five
Time:	5:13 pm	5:15 pm	n/a	n/a	n/a
Photo(s)#:	25	26	n/a	n/a	n/a

Film Roll #: 5.

Tides: 12:26 pm

Heights: 2.0 (h)

Moon: Three days after the first quarter moon.

Winds: Small crafts are still up, winds blowing on shore.

Observations: Less black sand visible off shore, no real distinct border out side as it is mostly concentrated right off of the beach/coastline areas.

As a result of the small crafts the last three days there is a lot more erosion occuring.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 10/05/95

Project Day: 89.

Site Location(s):	One	Two	Three	Four	Five
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 1:08 pm

Heights: 1.9 (h)

Moon: Four days after the first quarter moon.

Winds: No data collected.

Observations: No data collected due to scheduled day off.

HVO Meeting Notes: n/a

Site Location: One

Film Roll/Photo #: (5)25

Site Location: Two

Film Roll/Photo #: (5)26

Plate #: 48.

BLACK SAND BEACH PROJECT DATA:

Date: 10/06/95

Project Day: 90.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 1:47 pm

Heights: 1.8 (h)

Moon: Five days after the first quarter moon.

Winds: No data collected.

Observations: No data collected due to scheduled day off.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 10/07/95

Project Day: 91.

Site Location(s):	One	Two	Three	Four	Five
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 2:23 pm

Heights: 1.6 (h)

Moon: One day before the full moon.

Winds: No data collected.

Observations: No data collected due to taking leave off.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 10/08/95

Project Day: 92.

Site Location(s):	One	Two	Three	Four	Five
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 2:58 pm

Heights: 1.5 (h)

Moon: Full moon.

Winds: No data collected.

Observations: No data collected due to taking leave off.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 10/09/95

Project Day: 93.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	2.40 pm	2:42 pm	2:53 pm	2:53 pm	2:55 pm
Film Roll #:	5.				
Photo(s)#:	27	28	29	30	31

Tides: 3:32 pm

Heights: 1.3 (h)

Moon: One day after the full moon.

Winds: Strong trades, seas chopped.

Observations: There was an earthquake of 5.7 magnitude in Mexico at 5:30 am (Hawaii time) and was scheduled to create a one foot rise at around 12:45-1:00 pm., but nothing was noticeable due to the choppy seas.

During the four days in which I was off, an 'a'a flow broke out on Pulama Pali on the 7th and subsided by the 8th. There was a fairly good view of pahoehoe three miles out from the end of the road and extending down to the coast.

Definite erosional forces occurred at the beach area as exhibited by the photography.

HVO Meeting Notes: n/a

Site Location: One Film Roll/Photo #: (5)27

Site Location: Two Film Roll/Photo #: (5)28

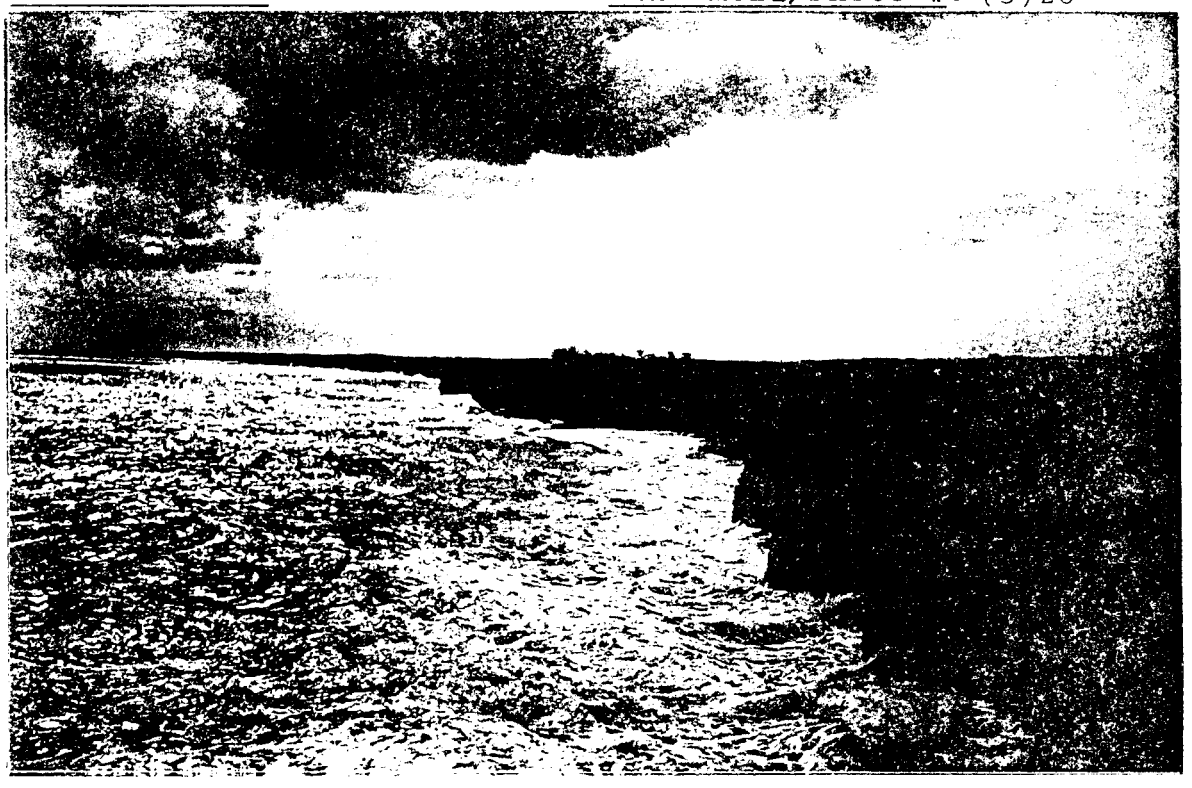


Plate #: 49.

Site Location: Three Film Roll/Photo #: (5)29

Site Location: Four Film Roll/Photo #: (5)30

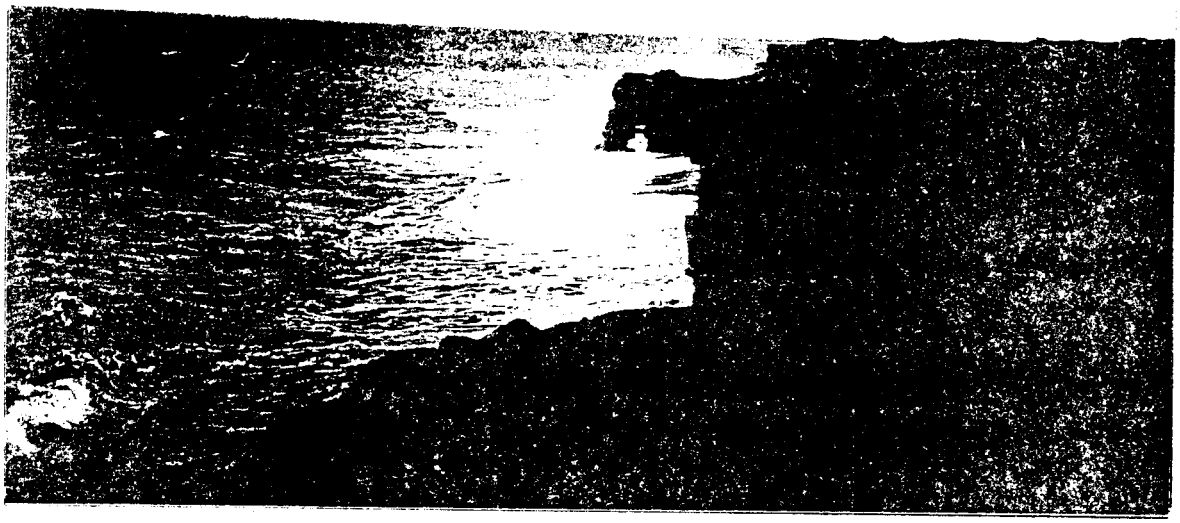
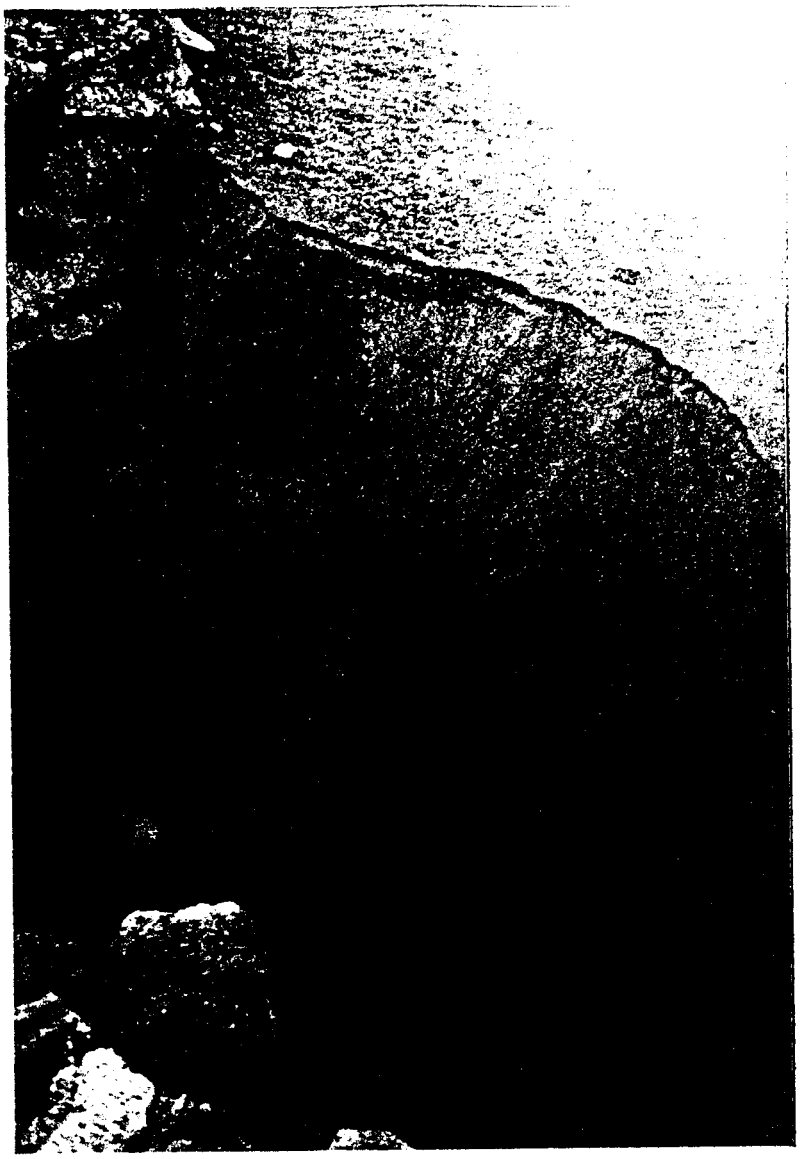


Plate #: 50.



Site Location: Five
Film Roll/Photo #: (5)31

Plate #: 51.

BLACK SAND BEACH PROJECT DATA:

Date: 10/10/95

Project Day: 94.

Site Location(s):	One	Two	Three	Four	Five
Time:	n/a	n/a	n/a	n/a	n/a
Film Roll #: n/a					
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Tides: 4:06 pm

Heights: 1.2 (h)

Moon: Two days after the full moon.

Winds: No data collected.

Observations: A large pahoehoe flow was observed during the evening hours on top of Pulama Pali and red continued to show off of the point. The plume is still very strong at the Kamoamoa/Waha'ula coastal entry.

HVO Meeting Notes:

Geology: The entry on the western edge of the current flow (east side of the field) continues to be strong. The south-westward moving spur that has broken off of the flow about .7-8 miles inland of the entry was believed last week to have reached the ocean east of the former Lae 'Apuki, but that is not the case. Steam in the area may have been caused by a bench collapse that exposed hot rock, though this is uncertain. (HVO staff has not been able to inspect that bench recently).

There was some question, particularly by Park personnel, as to whether the above spur was advancing through segments of the old tube, as several areas of flow appeared to be unconnected on the surface. These areas, however were found to be connected by thin streams flowing around tumuli (**no way**). Reoccupation of old tube-s has been observed by HVO staff, but rarely later than four days after a pause (when they are drained).

HVO Meeting Notes: (continued)
High on the slopes at the vent, the old tube, now deeply eroded (see notes on 10/02), was reoccupied at the end of late August pause. A little lower, in the area just above Pali Uli (roughly 2000-2200') a second tube has formed on the east side of the field where breakouts have been active, the old tube being a little to the west. Both tubes are active just above Pali Uli, but it is unclear whether that applies to the upper slopes of the pali itself. Breakouts continue to be visible on the pali after sundown.

Two small glowing holes were seen in the crust of the small pond in Pu'u 'O'O last week. The pond level appeared to be quite low, but fumes made it hard to make a measurement.

Note: The high lighted (**bold**) input is of my doing. Here is the other example of a bad call by visiting volunteers for HVO and having no local knowledge of the environment in which they are interpreting to their sponsors at HVO. They admit to the fact of not inspecting the area recently and yet say that reoccupation of old tubes are rare. Then they turn right around and talk about such an occurrence in late August. Despite what HVO says, I saw with my own eyes such reoccupation and it was not feed by thin streams of lava flowing around tumuli.

BLACK SAND BEACH PROJECT DATA:

Date: 10/11/95

Project Day: 95.

Site Location(s):	One	Two	Three	Four	Five
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 4:43 pm

Heights: 1.1 (h)

Moon: Three days after the full moon.

Winds: No data collected.

Observations: I was unable to photograph sites one/two; but the beaches continue to erode at the "Makai Trail" area and shift down the coastline to the sites above.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 10/12/95

Project Day: 96.

Site Location(s):	One	Two	Three	Four	Five
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 5:26 pm

Heights: 0.9 (h)

Moon: Four days after the full moon.

Winds: No data collected.

Observations: No data collected due to scheduled day off.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 10/13/95

Project Day: 97.

Site Location(s):	One	Two	Three	Four	Five
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 6:23 pm

Heights: 0.8 (h)

Moon: Five days after the full moon.

Winds: No data collected.

Observations: No data collected due to scheduled day off.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 10/14/95

Project Day: 98.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	12:50 pm	12:52 pm	n/a	n/a	n/a
Film Roll #:	5.				
Photo(s)#:	32	33	n/a	n/a	n/a

Tides: 7:51 pm

Heights: 0.8 (h)

Moon: Two days before the last quarter moon.

Winds: No data collected.

Observations: Per HVNP staff, there was no major changes in activity during my days off, very little red lava viewing on Pulama Pali. Definitely a lot less visible at the coast and the reactivated tube has shut down. HVO guys still doesn't believe that it happened despite the fact that they never checked it out

No surface flows observed on the pali during the evening and the plume is smaller in size (smaller volume, plugged tube or a surface flow we can't see out there?).

The beach continues to erode and shift, very little black sand line off shore.

HVO Meeting Notes: n/a

Site Location: One Film Roll/Photo #: (5)32

Site Location: Two Film Roll/Photo #: (5)33

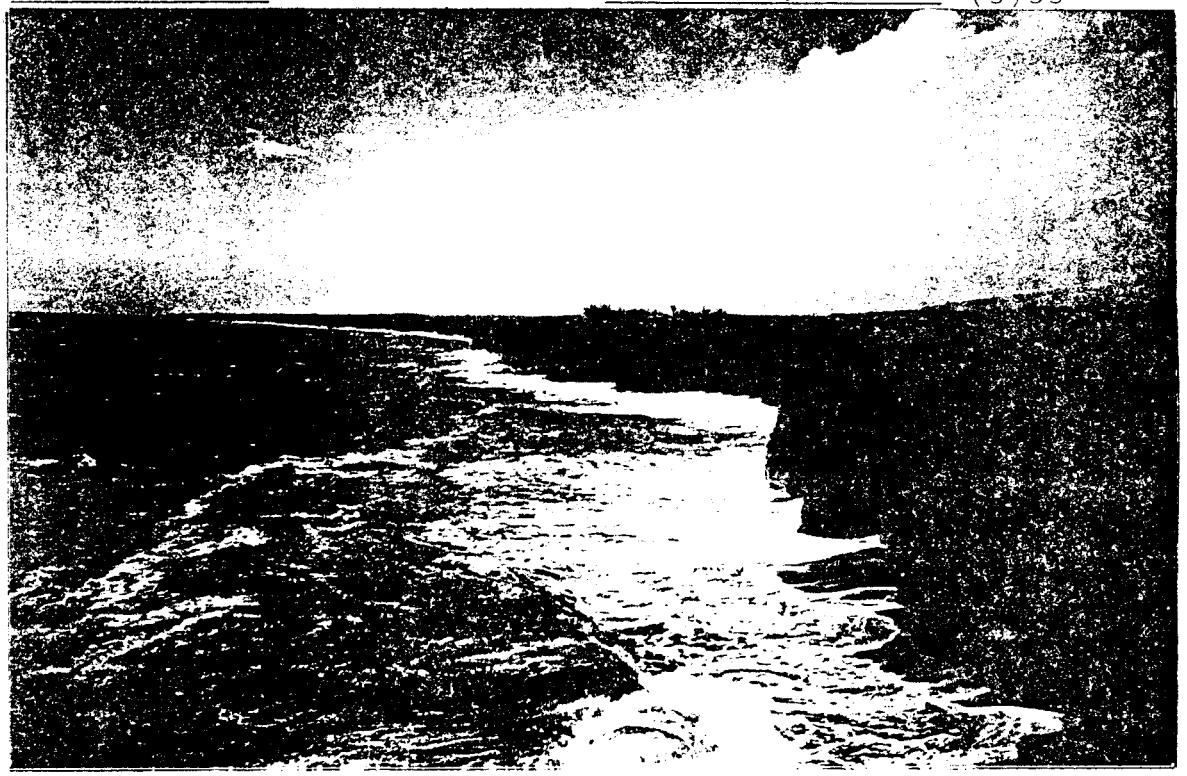


Plate #: 52.

BLACK SAND BEACH PROJECT DATA:

Date: 10/15/95

Project Day: 99.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 9:37 pm and 8:27 am

Heights: 0.8 (h) and 1.8 (h)

Moon: One day before the last quarter moon.

Winds: No data collected.

Observations: No red lava visible at all during the day or the evening, everything appears to be under ground from our perspect ive. A couple of visiting geologist did inform me that there is an active surface flow over two miles out in the main flow field

Had a couple of potential bench collapses out at the Kamoamoa Waha'ula ocean entry for there were large and dark clouds.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 10/16/95

Project Day: 100.

Site Location(s):	One	Two	Three	Four	Five
Time:	3:47 pm	3:50 pm	4:05 pm	4:05 pm	4:00 pm
Photo(s)#:	34	35	1(6)	2(6)	36

Film Roll #: 5. and 6.

Tides: 9:30 am

Heights: 1.8 (h)

Moon: The last quarter moon.

Winds: No data collected.

Observations: HVO geologist are calling the current ocean entry (Kamoamoa/Waha'ula) the Kamokuna entry. I shall continue to refer to them as I have throughout the project.

Very little indication of the black sand silt line and everything is continuing to erode, including the Panau Nui/Lae 'Apuki bench system.

HVO Meeting Notes:

Geology: The western lobe of the current flow, near the former Pu'u Manawalea, was dead as of last Friday (10/13). The dominant entry ia at Kamokuna (Kamoamoa/Waha'ula) and has been for over one week. Large cracks have formed on the bench and growth is slow. Kamoamoa entries are wispy. What appeared to be the reoccupation of the old tubes on the Kamoamoa delta was the result of lava entering short tube segments between the cliff and the bench cracks, a distance of perhaps up to 15 feet (**they now admit that it did in fact occur as I had stated**).

Surface flows appeared from time to time on Pulama Pali early in the week, but the pali was quiet over the weekend. There was a sizable surface flow in the Pali Uli area on the east side of the flow field during mid week.

HVO Meeting Notes: (continued)

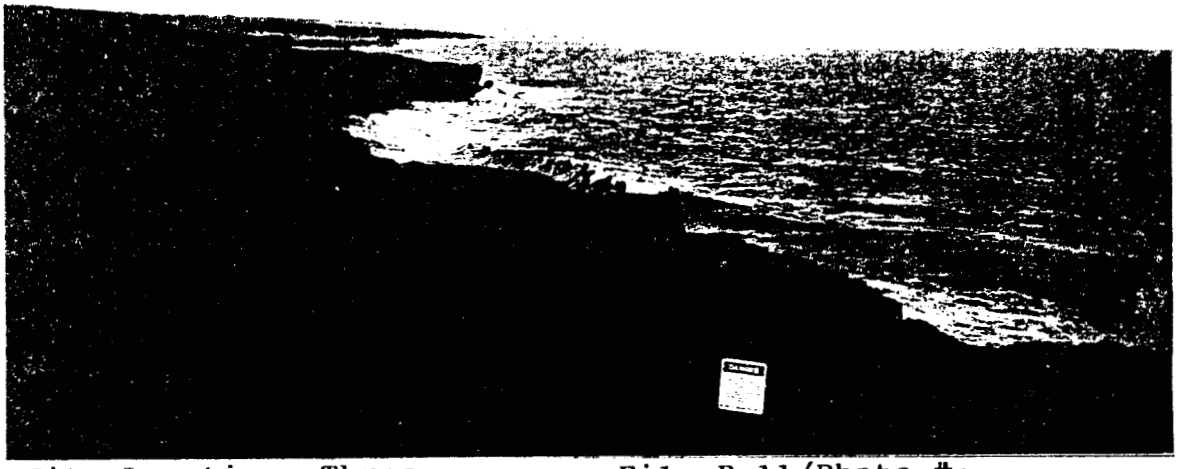
There has been a mayor collapse at the 2450' skylight, and also a large one at the 2020' skylight. In each case segments of the skylight rim have fallen in.

Note: I have also found the same to be true with the mauka skylight, its very dangerous to be around.

Site Location: One Film Roll/Photo #: (5)34

Site Location: Two Film Roll/Photo #: (5)35

Plate #: 53.



Site Location: Three Film Roll/Photo #: (6)1

Site Location: Four Film Roll/Photo #: (6)2

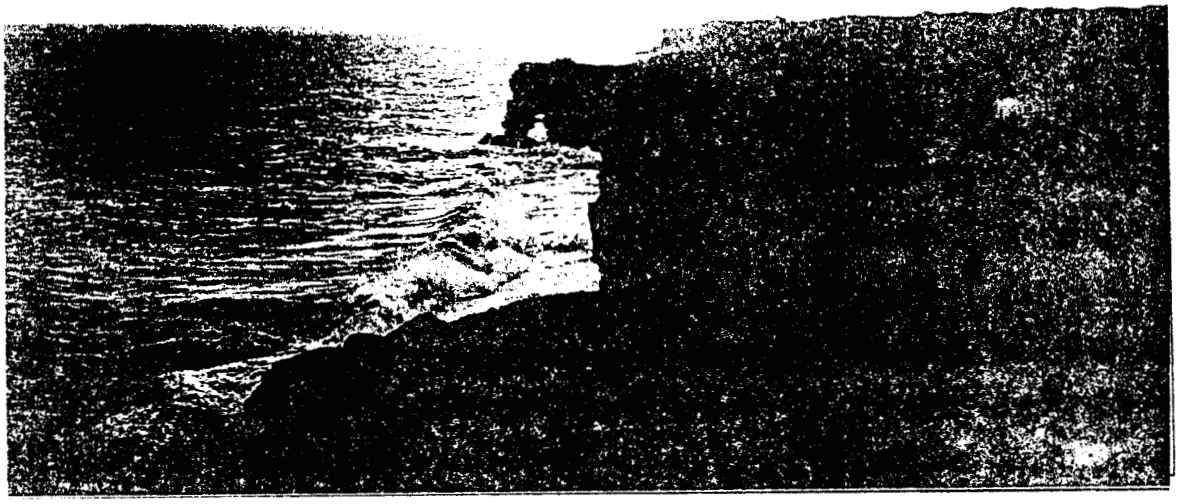
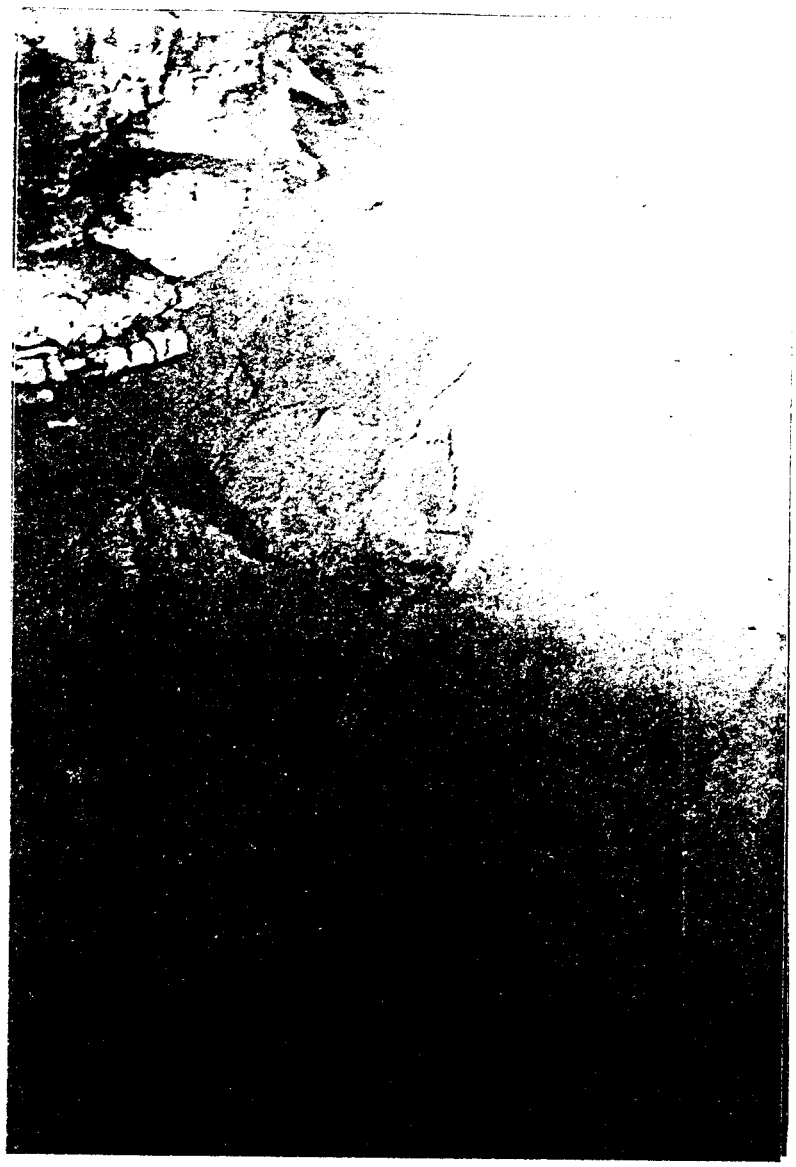


Plate #: 54.



Site Location: Five
Film Roll/Photo #: (5)36

Plate #: 55.

BLACK SAND BEACH PROJECT DATA:

Date: 10/17/95

Project Day: 101.

Site Location(s):	One	Two	Three	Four	Five
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 10:27 am

Heights: 1.7 (h)

Moon: One day after the last quarter moon.

Winds: Moderate trades blowing on shore, bad air quality.

Observations: Had only one surface outbreak just inland of the ocean entry during the evening and nothing on the pali. The beach continues to erode and shift.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 10/18/95

Project Day: 102.

Site Location(s):	One	Two	Three	Four	Five
Time:	5:17 pm	5:19 pm	n/a	n/a	n/a
Photo(s)#:	3	4	n/a	n/a	n/a

Film Roll #: 6.

Tides: 11:31 am

Heights: 1.7 (h)

Moon: Two days after the last quarter moon.

Winds: No data collected.

Observations: The surface flows appear to be advancing more towards the old littoral cone (last years development) near the original Highcastle region of Lae 'Apuki. Perhaps in a day or two it may hit the ocean, but its still to far to take visitors out to.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 10/19/95

Project Day: 103.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 11:58 am

Heights: 1.7 (h)

Moon: Three days after the last quarter moon.

Winds: No data collected.

Observations: Regular scheduled day off, but per HVNP staff; the surface flow observed yesterday (10/18) had stopped and the steam plume fluctuated in volume. Very little red showing during the evening and the tube system on Pulama Pali is giving off more gases than usual.

HVO Meeting Notes: n/a

Site Location: One Film Roll/Photo #: (6)3

Site Location: Two Film Roll/Photo #: (6)4

Plate #: 56.

BLACK SAND BEACH PROJECT DATA:

Date: 10/20/95

Project Day: 104.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 12:37 pm

Heights: 1.7 (h)

Moon: Four days after the last quarter moon.

Winds: No data collected.

Observations: Regular scheduled day off, but per HVNP staff; the steam plume at Kamokuna (Kamoamoa/Waha'ula) has almost completel shut down, very little volume of lava is in the tubes. Hardly any glow of the plume area, but a major one observed from the Pu'u 'O'O area. They think its a surface flow up top and on the Kau side of the Mo'o Lehua (Jason) flow.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 10/21/95

Project Day: 105.

Site Location(s):	One	Two	Three	Four	Five
Time:	n/a	n/a	n/a	n/a	n/a
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Film Roll #: n/a

Tides: 1:15 pm

Heights: 1.6 (h)

Moon: Two days before the new moon.

Winds: No data collected.

Observations: Sick leave taken,but per HVNP staff, there was still no plume activity and lots of glowing up top by Pu'u 'O'O.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 10/22/95

Project Day: 106.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	1:40 pm	1:43 pm	n/a	n/a	n/a
Film Roll #: 6.					
Photo(s)#:	5	6	n/a	n/a	n/a

Tides: 1:53 pm

Heights: 1.5 (h)

Moon: One day before the new moon.

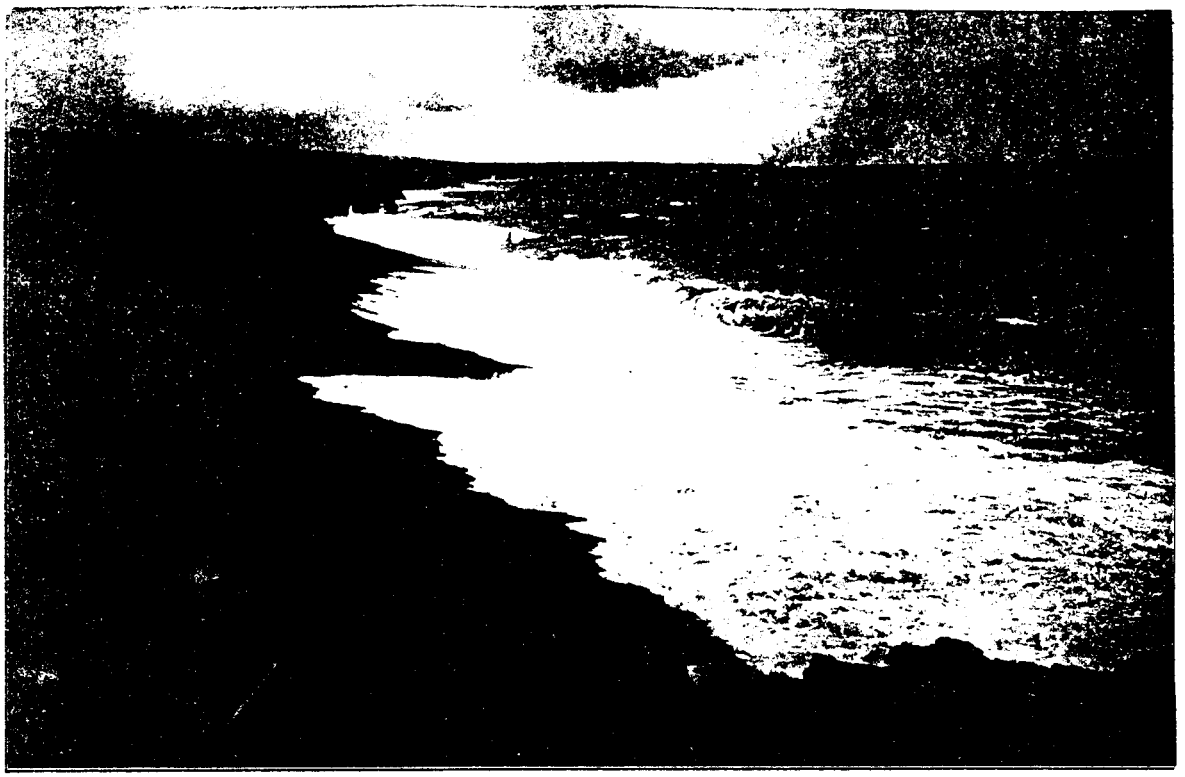
Winds: Strong trades, choppy seas.

Observations: Can definitely see the erosional process going on along the coastline, mostly along the "Makai Trail" area where more sea arches are being exposed.

There is no cloud cover, but the glow of the surface flow up by Pu'u 'O'O can be observed reflecting off of the de-gasing of the tube system running down Pulama Pali.

Very little glow at the coastal entry. Therefore, due to the surface flow up top there is no replacement of the black sand.

HVO Meeting Notes: n/a



Site Location: One Film Roll/Photo #: (6)5

Site Location: Two Film Roll/Photo #: (6)6

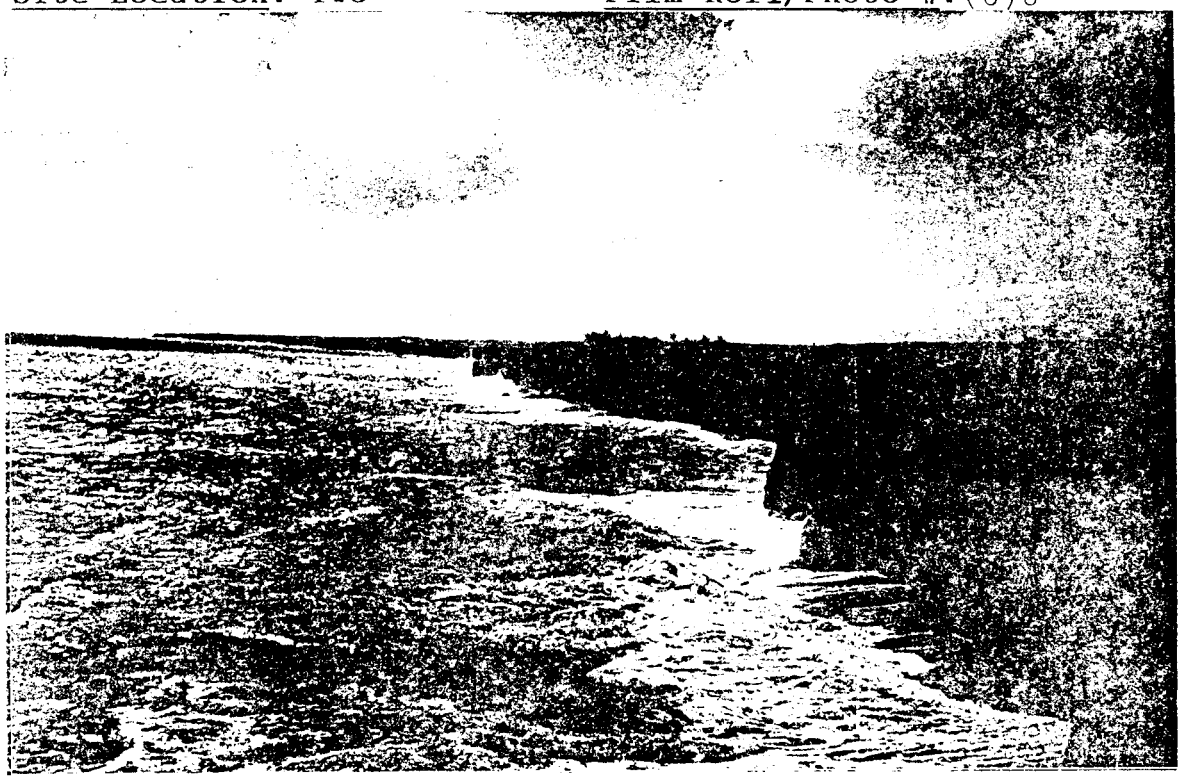


Plate #: 57.

BLACK SAND BEACH PROJECT DATA:

Date: 10/23/95

Project Day: 107.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	n/a	n/a	1:12 pm	1:12 pm	1:17 pm
Photo(s)#:	n/a	n/a	7	8	9

Film Roll #: 6.

Tides: 2:32 pm

Heights: 1.4 (h)

Moon: New moon.

Winds: Small craft warning in effect, winds blowing 30 mph.

Observations: The plume at Kamoamoa/Waha'ula is light still.

HVO Meeting Notes:

Geology: As of Tuesday (17th) red lava was visible above the Chain of Craters Road on the eastern side of the flow field. It was obvious then that surface flows along Pulama Pali had extended the field eastward in the past several weeks. The strong entry at Kamokuna (Kamoamoa/Waha'ula) continues (**not**). A second smaller entry had formed near it. There was a major bench collapse at the Kamokuna (Kamoamoa/Waha'ula) entry either late Tuesday or early Wednesday (18th), resulting in steam explosions that built a littoral (i.e. "near the shore") cone. Rangers at the end of the C. of C Rd, noted fluctuations in the entry steam plume through the day on Sunday (22nd) with some discoloration in the cloud. This may also have been related to explosions, although observations from across the entire flow field are inconclusive.

HVO Meeting Notes: (continued)

Rather persistent breakouts have been occuring high on the slopes above Pulama Pali over the weekend. Park staff reported unusual glow above the pali on Friday (20th) and Sunday (no word about Saturday the 21st), HVO personnel spotted flows at about the 2250 ' level on Friday, and Park fire crews who flew over the area on Saturday and Sunday reported seeing flows at about the same level. As of Monday morning there were no reports of these flows going over the crest of Pulama Pali.

Collapse at the 2450' level skylight, reported last week to have been noted the week before, continued last week. The skylight has grown from about 20' across to more than 98' across. At the same time the lava stream inside the tube has deepened and narrowed to about 16' across.

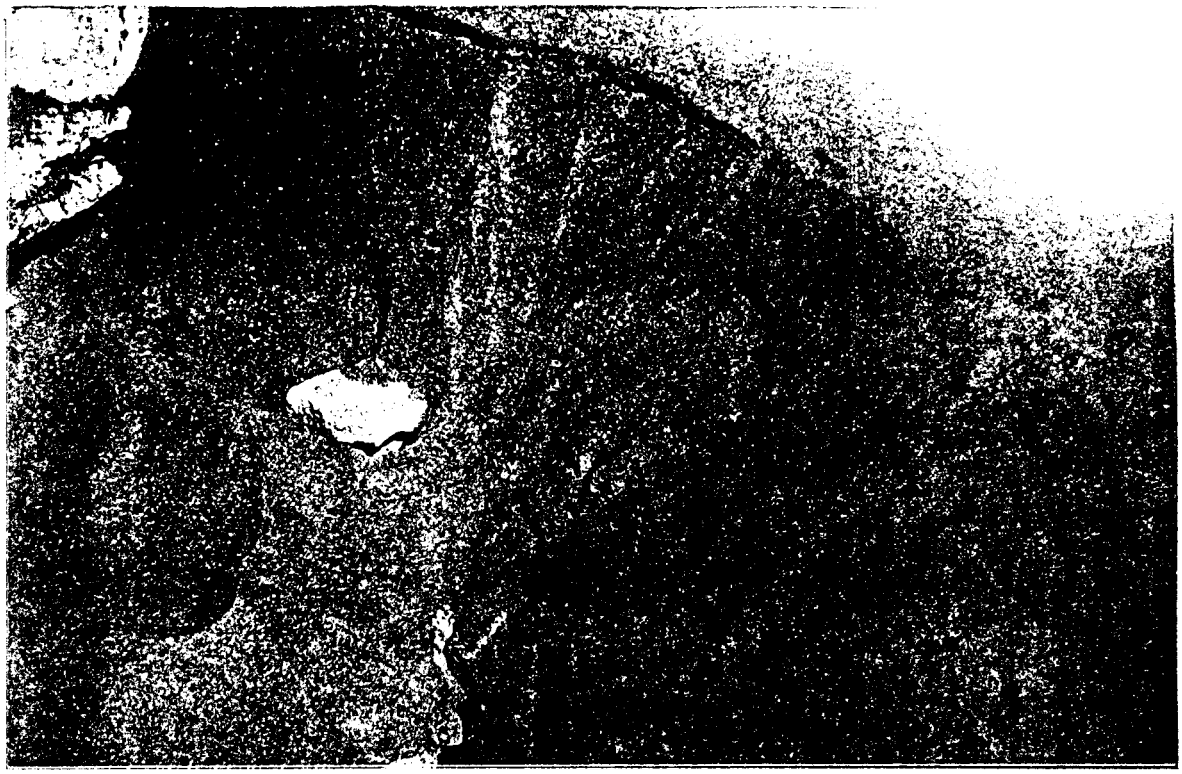
On Tuesday (17th) Pu'u 'O'O showed little change. The small pond, on which there was little activity, stood between 295 and 325' below the spillway.

Deformation: Measurements of Pu'u 'O'O between December 1994 and September 1995 show less than a centimeter difference in height.

Site Location: Three Film Roll/Photo #: (6)7

Site Location: Four Film Roll/Photo #: (6)8

Plate #: 58.



Site Location: Five

Film Roll/Photo #: (6)9

Plate #: 59.

BLACK SAND BEACH PROJECT DATA:

Date: 10/24/95

Project Day: 108.

Site Location(s):	One	Two	Three	Four	Five
Time:	n/a	n/a	n/a	n/a	n/a
Film Roll #: n/a					
Photo(s)#:	n/a	n/a	n/a	n/a	n/a

Tides: 3:13 pm

Heights: 1.3 (h)

Moon: One day after the new moon.

Winds: Small craft warnings are still posted.

Observations: No red lava visible at all and no glows are observed up on the pali; the surface flows must have stopped. Per a pilot friend of mine, there are no signs of any surface flows out there from Pu'u 'O'O to the coast.

The volume fluctuated at the ocean entry and there was a hugh dark steam plume observed at 4:40 pm; indicating a good size bench collapse.

HVO Meeting Notes: n/a

BLACK SAND BEACH PROJECT DATA:

Date: 10/25/95

Project Day: 109.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	1:45 pm	1:45 pm	n/a	n/a	n/a
Film Roll #:	6.				
Photo(s)#:	18	19	n/a	n/a	n/a

Tides: 3:57 pm

Heights: 1.1 (h)

Moon: Two days after the new moon.

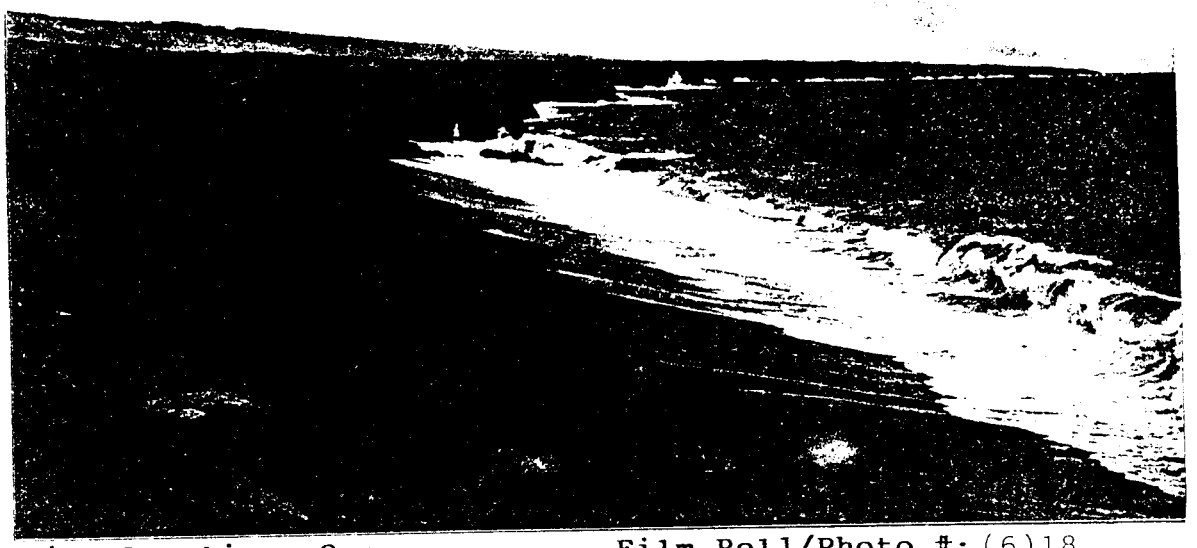
Winds: No data collected.

Observations: This is my last day working for the Hawaii Volcanoes National Park as a Park Ranger, therefore this will be the last project day.

There was no red lava visible at all, but there was a slight glow observed up by Pu'u 'O'O and then it had stopped.

As for the beaches they continue to erode and shift down the coastline to other coves and outcrops. Due to the small volume of lava entering the ocean several miles away and the waves and winds eroding away at the black sand here at Panau Nui/Lae 'Apuki area, it is likely that these beaches shall completely disappear within the next year. Such is the life-cycle for this particular geological occurrence helping to fill in the gaps where the pillow lava and surface flows have bypassed; thus adding tremendous weight to this already heavy island.

HVO Meeting Notes: n/a



Site Location: One Film Roll/Photo #: (6)18

Site Location: Two Film Roll/Photo #: (6)19

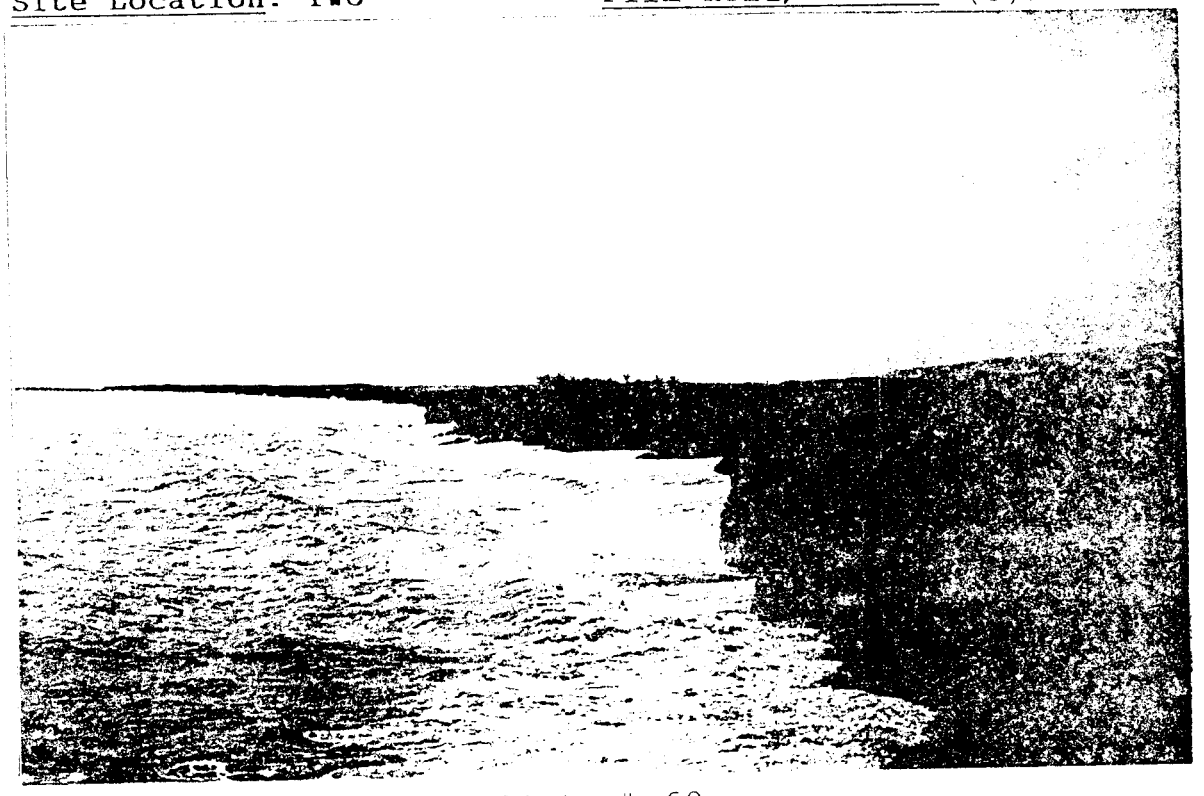


Plate #: 60.

BLACK SAND BEACH PROJECT DATA:

Date: 11/25/95

Project Day: Follow up.

Site Location(s):	**One**	**Two**	**Three**	**Four**	**Five**
Time:	5:37 pm	5:39 pm	n/a	n/a	n/a
Film Roll #: 6.					
Photo(s):	30	31	n/a	n/a	n/a

Tides: 5:53 pm

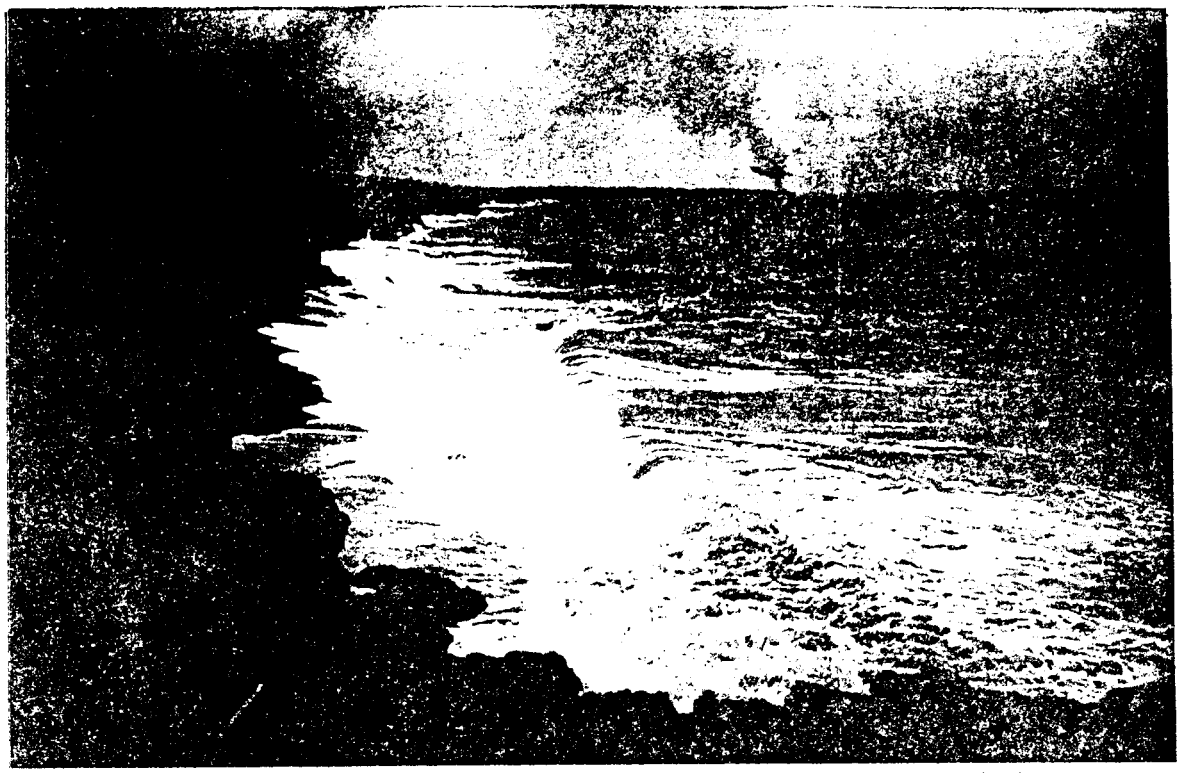
Heights: 0.8 (h)

Moon: Three days after the new moon.

Winds: Moderate trades blowing off shore.

Observations: During the big island geology field trip from November 24-27, 1995; we had an opportunity to check out the eruption site (from a distance) and hiked out to the old Highcastle (Lae 'Apuki) black sand beach in which Floyd McCoy has been studying for years. We also investigated the "Makai Trail" area and discovered major erosion had taken place (no photos of Sites 3 & 4 taken). After the hike I managed to get a couple shots of Sites 1 & 2 before it got completely dark. During the evening there was some red lava visible on the slopes of Pulama Pali (general area of previous out breaks) and a fairly good view of the ocean entry glow at Kamoamoa/Waha'ula. The plume appeared to be normal in out put of lava (500,000 cubic meters per day). Per HVNP staff, there has been little change in activity since my last day of work on 10/25/95 (one month from this date).

HVO Meeting Notes: n/a



Site Location: One Film Roll/Photo #: (6)30

Site Location: Two Film Roll/Photo #: (6)31

Plate #: 61.